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NAVAL POSTGRADUATE SCHOOL

MONTEREY, CALIFORNIA

MBA PROFESSIONAL REPORT

Navy Enterprise Resource Planning Program: Governance Challenges in Deploying an Enterprise-Wide Information Technology System in the Department of the Navy

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By: **Kevin L. Carey,**
Elmer D. Valle
December 2010

Advisors: **Douglas Brook,**
Douglas Brinkley

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The United States Department of the Navy (DoN) Enterprise Resource Planning (ERP) Program is deploying the largest enterprise-wide information technology (IT) system seen in any public sector organization to date. Along with this landmark project is a multitude of implementation challenges for the Navy to overcome. The DoN is using private industry best practices to establish the Navy ERP Program. Some of the challenges faced by the Navy may stem from the inherent differences between public and private sector organizations. If so, the management of IT system implementations in the Navy must therefore account for these sector differences, and cannot fully rely on private sector best practices. This paper will examine the implementation challenges of Navy ERP with respect to its public sector characteristics in order to provide a baseline for developing a governance framework for future enterprise-wide IT implementations in the DoN.

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NAVY ENTERPRISE RESOURCE PLANNING PROGRAM: GOVERNANCE CHALLENGES IN DEPLOYING AN ENTERPRISE-WIDE INFORMATION TECHNOLOGY SYSTEM IN THE DEPARTMENT OF THE NAVY

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Submitted in partial fulfillment of the requirements for the degree of

MASTER OF BUSINESS ADMINISTRATION

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NAVY ENTERPRISE RESOURCE PLANNING PROGRAM: GOVERNANCE CHALLENGES IN DEPLOYING AN ENTERPRISE-WIDE INFORMATION TECHNOLOGY SYSTEM IN THE DEPARTMENT OF THE NAVY

ABSTRACT

The United States Department of the Navy (DoN) Enterprise Resource Planning (ERP) Program is deploying the largest enterprise-wide information technology (IT) system seen in any public sector organization to date. Along with this landmark project is a multitude of implementation challenges for the Navy to overcome. The DoN is using private industry best practices to establish the Navy ERP Program. Some of the challenges faced by the Navy may stem from the inherent differences between public and private sector organizations. If so, the management of IT system implementations in the Navy must therefore account for these sector differences, and cannot fully rely on private sector best practices. This paper will examine the implementation challenges of Navy ERP with respect to its public sector characteristics in order to provide a baseline for developing a governance framework for future enterprise-wide IT implementations in the DoN.

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LIST OF ACRONYMS AND ABBREVIATIONS

ACAT	Acquisition Category
APICS	American Production and Inventory Control Society
ASN FM&C	Assistant Secretary of the Navy Financial Management and Comptroller
BEA	Business Enterprise Architecture
BMMP	Business Management Modernization Program
BPR	Business Process Reengineering
BTA	Defense Business Transformation Agency
CBP	Commercial Business Practices Working Group
CCA	Clinger-Cohen Act
CIM	Computer Integrated Manufacturing
CIO	Chief Information Officer
CFO	Chief Financial Officer
CFP	Commercial Financial Practices Working Group
CMO	Chief Management Officer
COPICS	Communications-Oriented Production Information and Control System
COTS	Commercial Off The Shelf
DBSMC	Defense Business Systems Management Committee
DCMO	Deputy Chief Management Officer
DoD	Department of Defense
DoN	Department of the Navy
DON-CIO	Department of the Navy Chief Information Officer
DRAM	Dynamic Random Access Memory
EDS	Electronic Data Systems Corporation
ERP	Enterprise Resource Planning
ESA	Enterprise Software Agreement
ESG	Executive Steering Group
ESI	Enterprise Software Initiative
ETP	Enterprise Transition Plan
FARA	Federal Acquisition Reform Act

FASA	Federal Acquisition Streamlining Act
FASAB	Federal Accounting Standards Advisory Board
FFATA	Federal Funding Accountability and Transparency Act
FFMIA	Federal Financial Management Improvement Act
FIAR	Defense Financial Improvement and Audit Readiness Plan
FISC	Fleet Industrial Supply Centers
FMFIA	Federal Managers Financial Integrity Act
FMMP	Financial Management Modernization Program
FY	Fiscal Year
GAO	United States Government Accountability Office
GF	General Fund
GIG	Global Information Grid
GMRA	Government Management Reform Act
GPRA	Government Performance and Results Act
HR	Human Resources
IBM	International Business Machines Corporation
IG	Inspector General
IT	Information Technology
ITMRA	Information Technology Management Reform Act
KPMG	Klynveld Peat Marwick Goerdeler
MRP	Material Requirements Planning
MRP-II	Manufacturing Resource Planning
NAVAIR	Naval Air Systems Command
NAVICP	Naval Inventory Control Point
NAVSEA	Naval Sea Systems Command
NAVSUP	Naval Supply Systems Command
NDAA	National Defense Authorization Act
NEMAIS	Navy Enterprise Maintenance Automated Information System
NESIB	Navy ERP Senior Integration Board
OMB	Office of Management and Budget
OPNAV	Office of the Chief of Naval Operations
PEO-EIS	Program Executive Office for Enterprise Information Systems

PM	Program Manager
PPBE	Planning, Programming, Budgeting, and Execution
PwC	PricewaterhouseCoopers
RAM	Random Access Memory
RBA	Revolution in Business Affairs
ROI	Return on Investment
RWIPT	Requirements Working Integrated Process Team
SAIC	Science Applications International Corporation
SAP	Systems, Applications, and Products in Data Processing Corporation
SECDEF	Secretary of Defense
SIMA	Shore Intermediate Maintenance Activity
SMART	Supply Maintenance Aviation Reengineering Team
SME	Subject Matter Expert
SMP	Strategic Management Plan
SOX	Sarbanes-Oxley Act
SPAWAR	Space and Naval Warfare Systems Command
SSC	SPAWAR Systems Center
SYSCOM	Systems Command
TOA	Total Obligation Authority
WCF	Working Capital Fund
Y2K	Year 2000

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I. INTRODUCTION

A. BACKGROUND

In an era where the Department of Defense (DoD) must find efficiencies to continue funding today's critical requirements, as well as address the uncertainties of tomorrow, business process reengineering (BPR) emerges as the method to eliminate non-value added practices and legacy system redundancy in the Department of the Navy (DoN). Since the 1980s, legislation has focused on monitoring and improving the effectiveness of internal controls regarding governmental financial operations. Over the past decade, the DoD has been operating within an increasingly financially constrained environment in which Congress continues to demand increased accountability and transparency regarding the use of appropriated funds.

During the 1970s, the manufacturing sector increased the efficiency of their production lines by implementing Material Requirements Planning (MRP) systems which later evolved to Manufacturing Resource Planning (MRP-II) software. The initial benefit of these early systems was improved decision-making resulting from improved data sharing among the various manufacturing process stakeholders. Seeing the merits of the system, private companies began developing software packages that would allow the system to include data from the other existing business processes (i.e., finance, marketing, sales, supply chain management, and human resources (HR)). In the 1990s, this new enterprise approach to efficient business management evolved into what we now know as Enterprise Resource Planning (ERP).

In order to comply with existing legislation (e.g., the Chief Financial Officer (CFO) Act) the DoN's Commercial Business Practices Working Group (CBP) recommended that the DoN invest in ERP software to manage its resources, provide financial transparency, and standardize acquisitions. In 1998, the DoN funded four independent ERP pilot programs to determine the feasibility of utilizing commercial-off-the-shelf (COTS) software to manage the DoN's financial, maintenance, supply chain

management, and inventory control programs. From 1998 to 2003, the ERP pilot programs demonstrated their ability to standardize business processes across their respective systems commands (SYSCOMs).

In 2003, the DoN decided to merge the four pilot programs into one integrated Navy enterprise system, Navy ERP. Under the direction of the Navy ERP Program office, the DoN is releasing the program in stages, systematically retiring legacy systems while integrating more functions into the Navy ERP system. When fully deployed, Navy ERP could be the largest ERP system in the world.

B. PURPOSE

ERP systems are information technology (IT) systems originally developed as private sector strategic management tools, but are now found in a variety of public sector organizations including all levels of local, state, and federal governments. A majority of the existing research regarding ERP lies within IT implementation in the private sector, thus it is logical to see many public sector organizations incorporating private sector best practices into their strategic IT planning and implementation processes. Yet, many public organizations have failed to implement an ERP system successfully. If an existing body of knowledge concerning successful best practices and lessons learned is utilized, why do public sector organizations fail to implement a working ERP system? Specifically, why are the DoD and the DoN experiencing so many challenges in their ERP implementation efforts?

Our project will look at the ERP implementation challenges experienced by the DoN. A comparison of private and public sector characteristics will help identify challenges resulting from any organizational differences. We will then examine the existing DoN IT governance structure, determine its effect on the current challenges and overall implementation process, and provide recommendations for potentially improving the IT governance structure.

C. RESEARCH QUESTIONS

Do public and private sector organizations possess inherent differences in their structure, governance, and decision-making? If so, the differences present specific challenges for each organization type, and raise the question of the applicability of private sector IT implementation best practices in a public sector setting. Therefore, applying private sector IT best practices will not address the unique challenges of public sector organizations. A public sector oriented framework must be used to examine the unique IT implementation challenges which result from the inherent differences between the private and public sector. Understanding the differences between the sectors will provide a guide for an analysis of the governance challenges within the Navy ERP Program.

The success of an enterprise-wide program is influenced by several governance facets: formal communications, alignment processes, and decision-making hierarchies. The chain of command is a decision-making construct well suited for the military. However, the cross functional nature of the Navy ERP Program may require a different governance structure to effectively implement the program. Rapidly evolving technology and business process requirements of enterprise-wide systems represent business transformation challenges never before faced by the Navy, and should require evaluation of the effectiveness of the existing governance structure of the Navy ERP Program. Our analysis will examine the implementation challenges of Navy ERP Program with respect to its public sector characteristics in order to provide a baseline for developing a governance framework for future enterprise-wide IT implementations in the DoN.

1. Primary Research Question

What are the qualitative differences between DoN and private sector governance structures that affect the strategic planning, implementation, and policy formulation of enterprise-wide IT systems?

2. Secondary Research Questions

- What entities, internal and external to the Navy, contribute to IT policy formulation, implementation, and enforcement?

- Who is responsible for developing the DoN's ERP requirements and how are they selected to participate?

D. METHODOLOGY

Our research will be conducted as follows: (1) literature review on the origin and development of ERP systems; (2) historical accounting of ERP implementation in the Navy from the initial pilot programs to its current state; (3) literature review of public and private sector organizational differences and the affect on IT governance; and (4) interviews of subject matter experts (SMEs) involved with the governance, decision making, and policy formulation processes of the Navy ERP program.

The literature review will provide: (1) a general definition of ERP and brief history of its origins and development; (2) IT system implementation best practices used in the public sector; (3) chronological review of Navy ERP systems development and policy formulation within the DoN; (4) a framework for identifying unique public sector IT planning, management, and implementation issues; and (5) a model for examining IT governance structures.

Using the suggested framework, an analysis of the historical accounting of the Navy ERP program will be conducted to identify public sector characteristics that may be contributing factors to the Navy's IT implementation challenges. The initial results will provide the background for the SME interviews we will conduct regarding the existing Navy ERP Program governance structure. Applying the collected data to our suggested model for developing IT governance structures, we will identify any strengths and weaknesses with the existing structure, and provide a possible alternative for the Navy ERP program IT governance structure.

The SMEs in our study will be solicited from Business Transformation Agency (BTA), Program Executive Office-Enterprise Information Systems (PEO-EIS), Office of the Assistant Secretary of the Navy Financial Management and Comptroller (ASN FM&C), Department of the Navy Chief Information Officer (DoN-CIO), Office of the Chief of Naval Operations (OPNAV) staff, the resource sponsor, and two private sector organizations. The SME share a high level of familiarity with the Navy ERP Program

and possess a collective experience base to include other ERP implementations and business process redesign efforts in private companies and other federal agencies. The interviews will be used to evaluate our empirical data regarding DoN public sector characteristics that could affect Navy ERP governance and provide insight into the existing IT governance structure for the program.

E. SCOPE

This project provides a policy level assessment of the governance structure of the Navy ERP Program. We provide information on public vs. private sector characteristics, existing implementation best practices, and governance theory, to establish a baseline for our analysis. We interview SME associated with the main governing bodies of the Navy ERP Program, determine the existing governance structure, and identify differences that pose challenges in adopting private sector practices. Our goal is to provide a baseline for researching and developing appropriate governance structures for future enterprise-wide IT systems in order to promote effective business transformation practices and efficient usage of funds in a highly constrained resource environment. The IT governance framework affects enterprise-wide IT investments and therefore affects the potential benefits. Previous research focused on best practices and implementation methods, with little emphasis on governance of the program. An enterprise-wide IT system will not realize its full potential unless a decision-making structure is designed to attain the expected benefits.

F. ORGANIZATION

Chapter II presents background information on ERP including the DoN definition of an ERP program, evolutionary development of ERP in the private sector, and implementation best practices employed by the private sector.

Chapter III provides a historical overview of the Navy ERP program from the initial pilot programs to its current state. Major policies influencing the adoption of the Navy ERP Program are also provided.

Chapter IV provides a framework to analyze IT-relevant public vs. private sector organizations, and identifies differing organizational characteristics that produce challenges in implementing private sector practices in the DoN.

Chapter V defines IT governance and establishes the key concepts regarding IT governance. A framework for developing IT governance structures is also introduced for analysis of the collected data.

Chapter VI analyzes the public sector characteristics of the DoN which affect the Navy ERP Program governance structure, the existing program governance model, and best practices best suited for the Navy ERP Program.

Chapter VII concludes the project by identifying governance challenges to overcome for successful implementation of enterprise-wide IT systems. Recommendations for overcoming these challenges, and developing an appropriate DoN IT governance structure, are presented.

II. ENTERPRISE RESOURCE PLANNING (ERP)

A. DEFINITION OF ERP

The American Production and Inventory Control Society (APICS) Dictionary defines ERP as a "framework for organizing, defining, and standardizing the business processes necessary to effectively plan and control an organization so the organization can use its internal knowledge to seek external advantage."[1] From a hardware/software perspective, an ERP system is basically an IT system with integrated groups of software modules providing management tools for a number of internal business processes (i.e., human resources, sales, marketing, distribution, manufacturing, inventory management, acquisition). The software architecture is designed to allow information transparency and accessibility across all functions and business units of an enterprise. ERP system implementation is intended to provide a single integrated system, replacing old, incompatible legacy systems, [2] and is viewed as "…commercial software packages [that] promise the seamless integration of all the information flowing through a company—financial and accounting information, human resource information, supply chain information, customer information."[3]

For the DoD and DoN specifically, the website of the Program Manager (PM) for the Navy ERP Program displays the following definition "Navy ERP is an integrated business management system that updates and standardizes Navy business operations, provides financial transparency and total asset visibility across the enterprise, and

1 Robert Jacobs and Ted Weston Jr., "Enterprise resource planning (ERP) - A brief history," *Journal of Operations Management* 25, no. 207 (December 2006): 357.

2 Mohammad A. Rashid et al., "The Evolution of ERP Systems: A Historical Perspective," in *Enterprise Resource Planning Solutions & Management*, ed. Fiona Fui-Hoon Nah (Hershey, PA: IRM Press, 2002), 35–50.

3 Thomas H. Davenport, "Putting the Enterprise into the Enterprise System," *Harvard Business Review* 76, no. 4 (July-August 1998):121–131, http://www.jps-dir.net/Forum/uploads/12967/Davenport_1998.pdf.

increases effectiveness and efficiency."[4] The Office of the Assistant Secretary of the Navy Financial Management and Comptroller exhibits the ERP relationships in Figure 1.

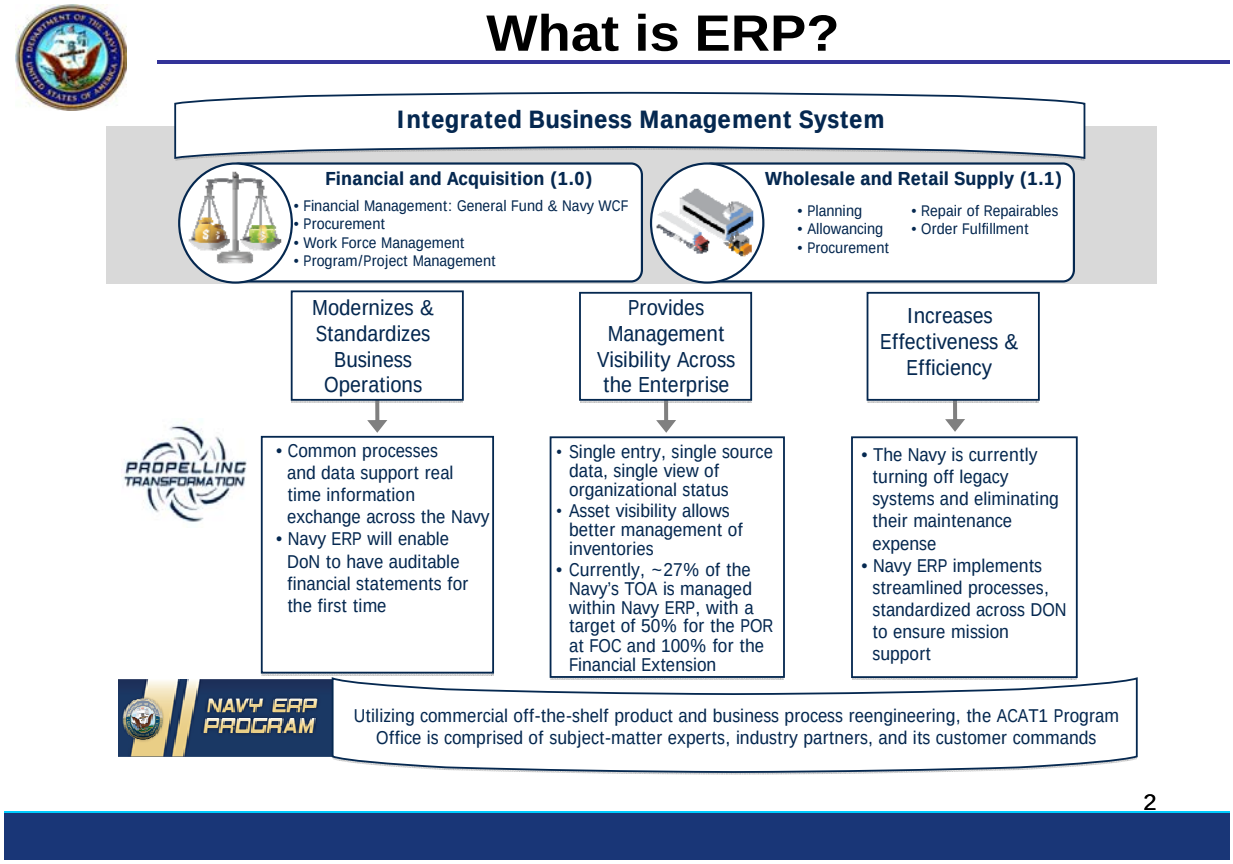
What is ERP?
Integrated Business Management System
Financial and Acquisition (1.0)
• Financial Management: General Fund & Navy WCF
• Procurement
• Work Force Management
• Program/Project Management
Wholesale and Retail Supply (1.1)
• Planning
• Allowancing
• Procurement
• Repair of Repairables
• Order Fulfillment
Modernizes & Standardizes Business Operations
Provides Management Visibility Across the Enterprise
Increases Effectiveness & Efficiency
PROPELLING TRANSFORMATION
• Common processes and data support real time information exchange across the Navy
• Navy ERP will enable DoN to have auditable financial statements for the first time
• Single entry, single source data, single view of organizational status
• Asset visibility allows better management of inventories
• Currently, ~27% of the Navy's TOA is managed within Navy ERP, with a target of 50% for the POR at FOC and 100% for the Financial Extension
• The Navy is currently turning off legacy systems and eliminating their maintenance expense
• Navy ERP implements streamlined processes, standardized across DON to ensure mission support
NAVY ERP PROGRAM
Utilizing commercial off-the-shelf product and business process reengineering, the ACAT1 Program Office is comprised of subject-matter experts, industry partners, and its customer commands
2

Figure 1. ASN-FMC, Office of Financial Operations ERP Definition[5]

B. ORIGINS OF ERP

Computing technology and ERP development have moved in lockstep for the past fifty years. Our historical accounting of ERP dates back to the early 1960s when the concept of ERP and its required technology were not even in existence. The predecessor of today's modern ERP system was MRP. MRP was born out of necessity as manufacturing organizations needed to improve on the ability to forecast future material

[4] Navy ERP Program Office, "About Navy ERP," Navy ERP Program, http://www.erp.navy.mil/about_erp.html.

[5] Beverly Veit, "Navy ERP: Where We've Been-Where We're Going," *Office of the Assistant Secretary of the Navy - Financial Management and Comptroller* (June 2010), http://www.finance.hq.navy.mil/fmc/PDI_2010/N-ERP%20Been%20&%20Going.ppt.

requirements. Determining material requirements manually yielded inaccurate results leading to excessive inventory of unwanted materials, inadequate inventory of needed materials, and exponentially increasing lead times for product delivery.[6]

One of the early projects to address the material requirements issue was a joint venture between International Business Machines (IBM) and JJ Chase, a heavy equipment manufacturer, seeking to provide a computerized solution for the firm's manufacturing and planning control requirements (e.g., economic order quantity, re-order point, safety stock, and inventory on hand).[7] Although computing capability in the 1960s was limited, the early MRP systems sufficed to fulfill the requirements identified in the manufacturing strategies implemented by many production firms. However, large scale implementation in the manufacturing industry was not feasible because the mainframe systems of the time were expensive and required an extensive amount of human capital investment to maintain the continued operations for collecting, retaining, and storing the data being generated.[8]

The development of random access memory (RAM) sparked the next evolutionary step on the path from MRP to ERP. During the late 1960s, a large amount of research was committed to proving the theoretical efficiency to be gained from using RAM chips over magnetic tape media. Then in 1968, Robert Heath Dennard patented the first single transistor Dynamic RAM (DRAM) chipset. Dennard's chips allowed smaller computers to compute more complex functions with less energy requirements and eventually became a standard for the computer industry by the mid 1970s. [9] The DRAM chipset allowed for faster operations and provided higher capacity memory storage,

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[6] Jos Peeters, "Early MRP Systems at Royal Philips Electronics in the 1960s and 1970s," *IEEE Annals of the History of Computing* 31, no. 2 (April-June 2009): 58, http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=5070066&tag=1.

[7] Robert Jacobs and Ted Weston Jr., "Enterprise resource planning (ERP) - A brief history," *Journal of Operations Management* 25, no. 207 (December 2006): 358.

[8] Peeters, Early MRP Systems, 58.

[9] Massachusetts Institute of Technology School of Engineering, "Inventor of the Week: Archive - Robert Dennard," *Lemelson-MIT program*, (July 2005), http://web.mit.edu/invent/iow/dennard.html.

therefore enabling the development of IT hardware able to incorporate a larger scale of complex business operations than previously possible with mainframe systems.[10]

During the 1970s, the advances in technology pushed MRP systems to the forefront of inventory management, therefore providing greater controls over plant-wide planning and operations. [11] The ability for MRP systems to integrate information from multiple manufacturing processes (e.g. forecasting, scheduling, and production) allowed companies to develop new strategies for diversifying their products and entering new markets. In 1972, IBM published a series of books on its Communications-Oriented Production Information and Control System (COPICS), which outlined what eventually become today's ERP systems (Figure 2). This decade also saw the emergence of several companies who would rise to become today's modern day ERP systems vendors (i.e., Oracle, Baan, J.D. Edwards, and Systems, Applications, and Products in Data Processing Corporation (SAP)). [12]

[10] Robert Jacobs and Ted Weston Jr., "Enterprise resource planning (ERP) - A brief history," *Journal of Operations Management* 25, no. 207 (December 2006): 358.

[11] Jos Peeters, "Early MRP Systems at Royal Philips Electronics in the 1960s and 1970s," *IEEE Annals of the History of Computing* 31, no. 2 (April-June 2009): 59–61, http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=5070066&tag=1.

[12] Jacobs, ERP History, 358 –359.

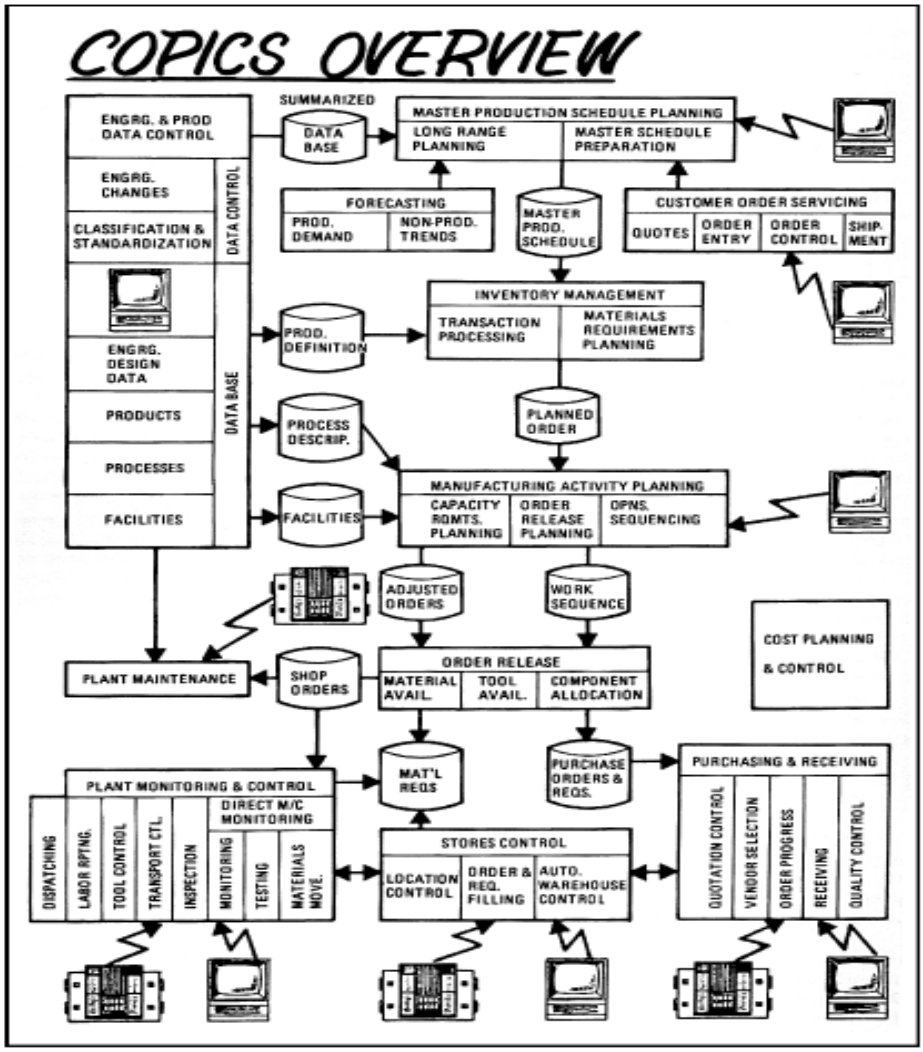

Figure 2. Functional Content of COPICS[13]

By the 1980s, improved hardware and increased computing and integrating capabilities moved MRP to its next stage of development, shifting from MRP to MRP-II. The hardware advances allowed for the development of software which could incorporate the MRP-II processes into all of a company's business units (manufacturing, HR, payroll, accounting) providing an opportunity for real-time data interchange and improved

13 Jos Peeters, "Early MRP Systems at Royal Philips Electronics in the 1960s and 1970s," *IEEE Annals of the History of Computing* 31, no. 2 (April-June 2009): 60, http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=5070066&tag=1.

accessibility of information in support of strategic decision making.[14] By the close of the 1980s, IBM, the dominant hardware provider of the time, introduced the Computer Integrated Manufacturing (CIM) framework, whose scope would eventually become the entire business *enterprise*, thus outlining the progression to today's ERP systems.

The Gartner Group is credited with coining the term ERP in the early 1990s and promoting the importance of horizontal and vertical integration of software throughout all of an enterprise's business units.[15] This evolutionary view of coordinating all business functions pushed SAP, Oracle, JD Edwards, Peoplesoft, and Baan to create software packages that capitalized on new client-server architectures with the ability to allow multiple terminals to share the computing load, thus signaling the move away from mainframe systems. However, it was the year 2000 (Y2K) dilemma that ushered in unprecedented growth in the development of ERP software and IT systems of the 1990s. The possibility of non-Y2K compliant legacy systems failing at the turn of the century resulted in the adoption of ERP by many enterprises.[16]

After Y2K, the bursting of the dot-com bubble ushered in a consolidation of software vendors with SAP and Oracle becoming the major players of the 2000s. Though the technological aspects of ERP have developed considerably over the last several decades, the theories underlying successful implementation and application are still in their infancy. This is highly evident when exploring ERP challenges away from traditional business enterprises (i.e., private sector companies) and will be addressed in this paper.

C. ERP IMPLEMENTATION BEST PRACTICES

Independent of sector, ERP implementation poses challenges for even the best run organizations. ERP in both the public and private sectors is difficult to implement for multiple reasons. Competing resources, changing priorities, and personnel shifts are just three very broad issues that management must overcome on a continuing basis. ERP

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[14] Robert Jacobs and Ted Weston Jr., "Enterprise resource planning (ERP) - A brief history," *Journal of Operations Management* 25, no. 207 (December 2006): 359–360.

[15] Jacobs, ERP History, 361.

[16] Jacobs, ERP History, 361–362.

programs are expensive to plan and implement, thus the cost must be weighed against the benefits. Many times, the cost of ERP technology is not always justified, especially for small companies. Furthermore, the numerous ERP failures along with the large initial investment of capital required to start a program must be rationalized before an organization can successfully plan to implement an ERP program.[17]

Research into these failures and successes has resulted in many researchers providing varying theories on ERP best practices. The cumulative findings of these theories identify the top private ERP implementation best practices (Table 1).

SOURCE	ERP Teamwork and Composition	Change Management Program and Culture	Top Management Support	Business Plan and Vision	BPR and Minimum Customization	Software Development, Testing and Troubleshooting	Effective Communication	Project Management	Monitoring and Evaluation of Performance	Project Champion
Holland et al. (1999)	X	X	X	X	X	X	X	X	X	-
Rosario (2000)	X	X	-	X	X	X	X	X	X	X
Sumner (1999)	X	X	X	-	X		X	X	X	X
Wee (2000)	X	X	X	X	X	X	X	X	-	-
Falkowski et al. (1998)	X	X	-	X	-	-	X	X	X	X
Roberts and Barrar (1992)	-	X	X	X	X	X	-	-	X	-
Bingi et al. (1999)	X	X	X	-	X	X	-	-	-	-
Buckhout et al. (1999)	X	-	X	X	-	-	-	-	-	-
Stefanou (1999)	X	-	-	-	-		-	-	-	X
Scheer and Habermann (2000)	-	-	-	-	-	X	-	-	-	-

Table 1. Private ERP Implementation Best Practices[18]

ERP Teamwork and Composition is the most noted factor in the successful implementation of ERP in the private sector. The team's only task is ERP implementation. The company must assign their top technical and business personnel to work in conjunction with the software consultants to deliver the most effective ERP program to the company.[19] Regular meetings and incentives will assist with team cohesiveness and speed of implementation.

[17] Christopher P. Holland and Ben Light, "A critical success factors model for ERP implementation," *IEEE Software* 16, no. 3 (May 1999): 30.

[18] Fiona Fui-Hoon Nah et al., "Critical factors for successful implementation of enterprise systems," *Business Process Management Journal* 7, no. 3 (2001): 288.

[19] Nah, Critical factors, 289.

Change Management Program and Culture is essential to ensure that all users of the new ERP software have a stake in the design and training. Users must be consulted and educated on the improvements and benefits that the ERP software will have over their legacy system. Their inputs during the design phase and training during the implementation phase will ease the ERP transition.[20] Continuous business process training and support will be required even after the ERP software is successfully implemented.

Top Management Support is crucial to the successful implementation process. ERP needs to be viewed by all as a strategic goal.[21] Management ensures success by publicly confirming ERP as a top priority as well as reinforcing it through policy changes, personnel involvement, and sufficient allocation of resources.

Business Plan and Vision is essential for establishing an ERP roadmap and strategy for the stakeholders to follow. The plan identifies the problems, solutions, resources, and risk. It considers the complexity of legacy systems and the resulting implementation stages required.[22] The vision explains how the business will improve and establishes employee expectations to ensure a successful ERP implementation.

BPR and Minimum Customization are important to ensure that the ERP software requires the minimum number of changes to work within the business process. Current business processes must change to fit the ERP software so that all of the benefits of the new software can be leveraged in improving enterprise efficiencies.[23] Minimizing ERP customization also facilitates easier future upgrades.

Software Development, Testing, and Troubleshooting have to be meticulously planned to ensure that all business systems interface properly with the ERP software.

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[20] Fiona Fui-Hoon Nah et al., "Critical factors for successful implementation of enterprise systems," *Business Process Management Journal 7*, no. 3 (2001): 293.

[21] Suprateek Sarker and Allen S. Lee, "Using a case study to test the role of three key social enablers in ERP implementation," *Information and Management* 40, no. 8 (September 2003): 825.

[22] Christopher P. Holland and Ben Light, "A critical success factors model for ERP implementation," *IEEE Software* 16, no. 3 (May 1999): 34.

[23] August-Wilhelm Scheer and Frank Habermann, "Making ERP a success," *Communications of the ACM* 43, no. 4 (April 2000): 57.

Developing and testing interfaces as early as possible ensures that all critical applications are captured in the ERP software and that all problems are quickly resolved.[24]

Effective Communication is the universal solution to many problems. ERP cannot be planned or implemented in a vacuum. Everyone in the organization needs to be continually updated on ERP implementation efforts. All stakeholders from users to top management have valuable insight into the business process and their inputs need to be obtained to ensure ease of implementation and acceptance from all levels of the organization.[25] Continually communicating goals, expectations, and progress reinforces ERP's top priority in the organization.

Project Management by the ERP team focuses on supervising resources, business processes, software, consultants, and timelines to ensure successful ERP implementation. The team manages the ERP roadmap so that benefits and issues are assessed with respect to cost and schedule. The team ensures that successful software implementation is deployed on time and that all users are properly trained to exploit the benefits that the new ERP software delivers. Tailoring a new governance model which facilitates the new standardized business processes empowers the team to tackle tough decisions.[26] The team plans and ensures continued ERP support to all stakeholders.

Monitoring and Evaluation of Performance is an ongoing process throughout the ERP implementation process. Like project management, the team has to ensure that the project stays on track. A constant evaluation of metrics based on business performance, cost, and schedule reports will ensure that the project follows the ERP business plan.[27] Reports from users update the team on issues and help the team provide a better end product.

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[24] Fiona Fui-Hoon Nah et al., "Critical factors for successful implementation of enterprise systems," *Business Process Management Journal* 7, no. 3 (2001): 294.

[25] Nah, Critical factors, 291.

[26] Jim Welch and Dmitry Kordysh, "Seven Keys to ERP Success," *Strategic Finance* 89, no.3 (September 2007): 41.

[27] Nah, Critical factors, 294.

Although Project Champion is in the last column and resulted in the fewest comments in the research cited, the idea that an ERP project needs an influential leader cannot be understated. A strong leader will guide the business plan and vision by providing credibility to the implementation. He must have the power and authority to dismiss resistors and create a cooperative environment for efficient ERP implementation.[28] A project champion is critical when a resistant manager out ranks the team. The project champion must have power over all departments to ensure that resistance to change is minimized and doesn't result in the failure of the ERP system.

[28] Suprateek Sarker and Allen S. Lee, "Using a case study to test the role of three key social enablers in ERP implementation," *Information and Management* 40, no. 8 (September 2003): 821.

III. NAVY ERP PROGRAM

A. THE FOUR PILOT PROGRAMS

In 1998, the DoN's Commercial Business Practices Working Group (CBP) recommended that the DoN implement an ERP software system to modernize its business practices and replace redundant, expensive legacy business systems in order to improve financial management accountability and transparency.[29] The CBP sought to leverage commercial best business practices to improve the efficiency and effectiveness of the DoN's business practices.

The DoN authorized six ERP pilot programs to test the feasibility of implementing ERP COTS software within the DoN. The six different functional pilot programs focused on distinct aspects of management, such as contracting and intermediate-level maintenance. Only four of the original six pilot programs were funded: Naval Air Systems Command (NAVAIR), Space and Naval Warfare Systems Command (SPAWAR), Naval Supply Systems Command (NAVSUP), and Naval Sea Systems Command (NAVSEA). Commander in Chief Pacific Fleet was to focus on facilities management and United States Marine Corps on logistics management, but both were abandoned due to budget constraints.[30] The four approved pilot programs were implemented between 1998 and 2003, focusing on separate management functions (Table 2).

29 U.S. Government Accountability Office, *DOD Business systems modernization: Navy ERP adherence to best practices critical to avoid past failures, GAO-05-858* (Washington, DC: Government Accountability Office, 2005), 11.

30 U.S. Government Accountability Office, GAO-05-858, 11.

ERP Pilot	Organization	Area of pilot's focus	Initial Start	Cost through FY 2004*
CABRILLO	Space and Naval Warfare Systems Command	Financial Management • Navy Working Capital Fund	June 2000	$67.4
SMART	Naval Supply Systems Command	Supply Management • Intermediate-Level Maintenance Management • Interface to Aviation Depots	August 2000	$346.4
NEMAIS	Naval Sea Systems Command	Regional Maintenance • Intermediate-Level Maintenance Management • Project Systems • Workforce Management	June 2000	$414.6
SIGMA	Naval Air Systems Command	Program Management with linkage among: • Contract Management • Financial Management • Workforce Management	May 2001	$215.9
Total				**$1,044.30**

*Dollars in millions. The costs reflect amounts disbursed through September 30, 2004, as reported by the Navy ERP program.

Table 2. Navy ERP Pilot Projects[31]

SPAWAR awarded their project CABRILLO contract to PricewaterhouseCoopers (PwC) in June 2000. PwC utilized SAP COTS software to demonstrate financial management capabilities in a Navy Working Capital Fund (WCF) at SPAWAR Systems Center (SSC) San Diego.[32] PwC and SAP in cooperation with other subcontractors collaborated on the implementation and integration of the ERP software. The CABRILLO project launched in July 2001 and incorporated the additional functions of project, workforce, and asset management.

NAVSEA awarded their Navy Enterprise Maintenance Automated Information System (NEMAIS) project contract to IBM in June 2000. IBM utilized SAP COTS software to demonstrate regional maintenance capabilities at Shore Intermediate

[31] U.S. Government Accountability Office, *DOD Business systems modernization: Navy ERP adherence to best practices critical to avoid past failures, GAO-05-858* (Washington, DC: Government Accountability Office, 2005), 13.

[32] SPAWAR Systems Center, San Diego (SSC San Diego), "Project Cabrillo," *Space and Naval Warfare Systems Command (SPAWAR)* (April 2001): 2, http://www.spawar.navy.mil/sti/publications/pubs/sd/348/sd348r1.pdf.

Maintenance Activity (SIMA) Norfolk.[33] IBM and SAP in cooperation with other subcontractors collaborated on the implementation and integration of the ERP software. The NEMAIS project launched in June 2002 and incorporated the additional functions of project, financial, and workforce management.

NAVSUP partnered with NAVAIR to award their Supply Maintenance Aviation Reengineering Team (SMART) project contract to Electronic Data Systems Corporation (EDS) in August 2000. EDS utilized SAP COTS software to demonstrate supply chain management capabilities on E-2C and LM-2500 engine maintenance.[34] EDS, SAP, and Deloitte collaborated on the implementation and integration of the ERP software. The SMART project launched January 2003 and incorporated the additional functions of maintenance and financial management.

NAVAIR awarded their project SIGMA contract to Klynveld Peat Marwick Goerdeler (KPMG) in May 2001. KPMG utilized SAP COTS software to demonstrate acquisition program management capabilities in the E-2C Hawkeye program.[35] KPMG, IBM, Science Applications International Corporation (SAIC), and a cadre of subcontractors collaborated on the implementation and integration of the ERP software. The SIGMA project launched in October 2002 and incorporated the additional functions of contract, financial, and workforce management.

The pilot programs were funded and supervised by their respective component organizations. Table 3 catalogs the various subcontractors employed to plan and execute the four individual ERP implementations using the SAP compatible software, Bolt-Ons.

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[33] SPAWAR Systems Center, San Diego (SSC San Diego), "Project Cabrillo," *Space and Naval Warfare Systems Command (SPAWAR)* (April 2001): 2 http://www.spawar.navy.mil/sti/publications/pubs/sd/348/sd348r1.pdf.

[34] SSC San Diego, Project Cabrillo, 2.

[35] SSC San Diego, Project Cabrillo, 2.

	Regional Maint.	PM Mgt.	Financial Mgt.	AvSCM/MM
SAP R/3 Version	4.6	4.6	4.6	4.6
Integrator	IBM	KPMG (prime)	PricewaterhouseCoopers	EDS
		SAIC (core)		
		IBM (core)		
Subcontractor	SAP Lockhead Martin DSIC SAIC/AMSEC KPMG	SAP Lockhead Martin Sierra Consulting LLC WDS MATCOM	SAP UII Logicon/INRI CSC	SAP Deloitte
Bolt-Ons	OROS Oracle Documentum Jet Form i2 MQ - Series Plantware Abaco	OROS Oracle Documentum Jet Form ESRI MQ - Series NAVAIR Corp. Sys. Abaco	OROS Prologix Major Procurement (TBD)	Manugistics Xelus

Table 3. Function and Integrators[36]

Although all four pilots selected the same SAP COTS software, each SYSCOM configured the software differently to manage their area of focus. This resulted in the pilots being incapable of integration, and allowed redundant functions across each pilot (Table 4). The core functions of ERP should focus on integrated enterprise applications and the DoN was failing.[37] Contract cost growth, pilot divergence, and a lack of centralized management oversight forced the DoN to reorganize the four pilots to meet the requirements of managing their enterprise.[38] In 2003, the DoN began development of a new navy-wide system, Navy ERP. Today, Navy ERP is centrally managed by the Navy ERP Program Office.

[36] DoN Executive Steering Group (ESG), "ERP 4 program overview," *Department of the Navy Research, Development & Acquisition* (August 2000): 6, https://acquisition.navy.mil/content/download/1422/6924/file/erp.pdf.

[37] U.S. Government Accountability Office, *DOD Business systems modernization: Navy ERP adherence to best practices critical to avoid past failures (GAO-05-858)* (Washington, DC: Government Accountability Office, 2005), 15.

[38] U.S. Government Accountability Office, GAO-05-858, 14.

FUNCTION PERFORMED	NEMAIS	CABRILLO	SIGMA	SMART
Material Management				
Sales and Distribution	X	X	X	X
Procurement	X	X	X	
Financial Management				
Financial Accounting	X	X	X	X
Revenue and Cost Controlling	X	X	X	X
Asset Accounting	X	X	X	X
Budgeting and Funds Management	X	X	X	
Program Management				
Project Management	X	X	X	
Planning, Budgeting, & Control	X	X	X	
Workforce Management				
Time and Attendance	X	X	X	

Table 4. Redundant Functions[39]

B. MAJOR POLICIES

Since the 1980s, Congress has passed a series of congressional initiatives focused on improving accounting methods, financial management practices, and performance reporting in the U.S. government. Each new policy provided expansive guidance and occasionally established new positions to maximize the utilization of appropriated funds and modernize government processes. The following is an explanation of the policies (Table 5) which affect the management of the public sector.

The Federal Managers Financial Integrity Act (FMFIA) of 1982 amended the Accounting and Auditing Act of 1950 by establishing evaluation guidelines for each agency to ensure effective internal accounting and administrative controls.[40] The controls verify lawful obligations, minimize misappropriations, and properly record revenues and expenditures to facilitate reliable financial and statistical reporting. The results of these annual agency control evaluations are reported to the President and

[39] U.S. Government Accountability Office, *DOD Business systems modernization: Navy ERP adherence to best practices critical to avoid past failures, GAO-05-858* (Washington, DC: Government Accountability Office, 2005), 18.

[40] *Federal Managers Financial Integrity Act of 1982,* Public Law 97-255, 97th Congress (September 8, 1982).

Congress every year. Office of Management and Budget (OMB) Circular A-123, Management's Responsibility for Internal Control, provides guidance to comply with FMFIA.

YEAR	LEGISLATION
1982	Federal Managers Financial Integrity Act (FMFIA)
1990	Chief Financial Officers (CFO) Act
1993	Government Performance and Results Act (GPRA)
1994	Government Management Reform Act (GMRA)
1994	Federal Acquisition Streamlining Act (FASA)
1996	Federal Financial Management Improvement Act (FFMIA)
1996	Clinger-Cohen Act (CCA)
2002	Sarbanes-Oxley (SOX) Act
2005	FY05 National Defense Authorization Act (NDAA)
2006	Federal Funding Accountability and Transparency Act (FFATA)
2008	FY08 National Defense Authorization Act (NDAA)
2010	FY10 National Defense Authorization Act (NDAA)

Table 5. Public Sector Management Focused Legislation

The CFO Act of 1990 established Deputy Director for Management in OMB and an Office of Federal Financial Management headed by a Controller, while designating a CFO in each executive department and major agency in the Federal government responsible for improving financial management practices.[41] The head of each agency submitted to the Director of OMB a proposal for reorganizing their agency on the basis of improving financial management functions. The CFO Act supports Congress' financial management reform objectives by providing reliable financial reports so decision makers can evaluate Federal programs and reduce wasteful spending. The twenty four CFOs produce annual financial statements prepared according to OMB guidance and certified by the agency Inspector General (IG).

[41] *Chief Financial Officers (CFO) Act of 1990,* Public Law 101-576, 101st Congress (November 15, 1990).

The Government Performance and Results Act (GPRA) of 1993 required federal agencies to submit a multiyear strategic plan for their programs to OMB and Congress.[42] These annual performance plans establish performance indicators used to compare actual program results against established performance goals to improve Federal program effectiveness and public accountability.

The Government Management Reform Act (GMRA) of 1994 reforms the management of HR and finances.[43] The Act requires the twenty four CFO agencies to submit, to OMB and the agency Inspector General, auditable financial statements which reflect assets, liabilities, and results of operations. OMB consolidates the twenty four financial statements and the Secretary of the Treasury prepares a Federal financial statement which is audited by the US Comptroller General. The Treasury's financial statement presents the overall financial position of the US government.

The Federal Acquisition Streamlining Act (FASA) of 1994 requires the DoD include an assessment of acquisition program achievement goals in their annual report to the President and Congress.[44] The DoD shall also collect and maintain standardized information on the acquisition workforce which conforms to standards established by OMB.

The Federal Financial Management Improvement Act (FFMIA) of 1996 expands the CFO Act, GPRA, and GMRA by incorporating Federal Accounting Standards Advisory Board (FASAB) concepts and standards into Federal financial management systems.[45] This allows Congress to evaluate the cost and performance of Federal programs and activities. FFMIA addresses Congress' need to eliminate deficiencies in Federal accounting standards and strengthen Federal accounting controls.

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[42] *Government Performance and Results Act of 1993*, Public Law 103-62, 103rd Congress (August 3, 1993).

[43] *Government Management Reform Act of 1994*, Public Law 103-356, 103rd Congress (October 13, 1994).

[44] *Federal Acquisition Streamlining Act of 1994*, Public Law 103-355, 103rd Congress (October 13, 1994).

[45] *Federal Financial Management Improvement Act of 1996*, Public Law 104-208, 104th Congress (September 30, 1996).

The Clinger-Cohen Act (CCA) formerly the Information Technology Management Reform Act (ITMRA) of 1996 requires the integration of IT planning with agency strategic planning, budgeting, and performance assessment to improve the productivity, efficiency, and effectiveness of Federal programs.[46] CCA also creates the new position of CIO in each agency who evaluates the performance of IT programs on the basis of performance measurements. Each agency along with their CIO and CFO establish policies to ensure that their IT management systems effectively provide reliable and timely program performance data.

The Sarbanes-Oxley (SOX) Act of 2002 introduced major changes to financial management practices and corporate governance for all U.S. public companies and public accounting firms.[47] Although SOX was enacted in reaction to major corporate and accounting scandals, its policies of increased financial transparency and internal control assessments have affected both the private and public sectors. Financial statements must fairly present all financial conditions and issues. Annual reports shall assess the effectiveness of internal controls and procedures. A credible and detailed security policy must be established.

The FY05 National Defense Authorization Act (NDAA) directed the DoD to establish a Defense Business Systems Management Committee (DBSMC) responsible for leading defense business system transformation and improvements.[48] FY05 NDAA requires the DoD develop a business enterprise architecture to cover all defense business system functions and activities.

The Federal Funding Accountability and Transparency Act (FFATA) of 2006 requires full disclosure of all entities and organizations receiving Federal funds.[49] OMB

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[46] *Information Technology Management Reform Act of 1996*, Public Law 104-106, 104th Congress (February 10, 1996).

[47] *Sarbanes-Oxley Act of 2002*, Public Law 107-204, 107th Congress (July 30, 2002).

[48] *National Defense Authorization Act for Fiscal Year 2005*, Public Law 108-375, 108th Congress (October 28, 2004).

[49] *Federal Funding Accountability and Transparency Act of 2006*, Public Law 109-282, 109th Congress (September 26, 2006).

established a publicly accessible website, which presents data on each federal financial assistance and expenditure. FFATA was enacted to expand federal agencies' accountability and reduce irresponsible spending.

The FY08 NDAA designates the Deputy Secretary of Defense (SECDEF) as the Chief Management Officer (CMO) for the DoD and provides for a Deputy Chief Management Officer (DCMO).[50] The DCMO supervises the BTA to better synchronize, integrate, and coordinate DoD business operations. FY08 NDAA requires the DoD to develop a Strategic Management Plan (SMP), update the plan every two years, and submit a report to Congress on each plan. This SMP details the DoD's overall strategic planning and management framework as well as performance goals and measures. FY08 NDAA enhances FMFIA requirements.

The FY10 NDAA requires the military department CMO to determine whether or not appropriate BPR efforts have been undertaken before the DoD approves a new business system modernization program.[51] Previously approved defense business system modernizations with a total cost in excess of $100 million must be reviewed by the department CMO to determine whether appropriate BPR efforts were conducted. If not, the department CMO must develop a plan to restore the reengineering efforts. The FY10 NDAA also requires all twenty four CFO agencies' financial statements be ready for validation on September 30, 2017.

The DoD initially implemented an uncoordinated approach to comply with the numerous legislative requirements of the time. The DoD eventually turned to BPR to coordinate its objectives and centralize the functions of its many independent, specialized systems. However, as Congress increased federal requirements, the DoD recognized the need to leverage the business process improvements of the private sector to improve the efficiencies of its financial operations.

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[50] *National Defense Authorization Act for Fiscal Year 2008,* Public Law 110-181, 110th Congress (January 28, 2008).

[51] *National Defense Authorization Act for Fiscal Year 2010,* Public Law 111-84, 111th Congress (October 28, 2009).

C. HISTORICAL TIMELINE

In the early 1990s, the "seemingly never ending disclosures of fraud, waste, abuse, and mismanagement in federal programs painted a picture of a government unable to manage its programs, protect its assets, or provide taxpayers with the effective and economical services they expect".[52] U.S. Government realized that effective and efficient financial management reform required improved financial oversight of government operations, and implemented the CFO Act. Two key mandates outlined in the CFO Act required government agencies to develop and implement integrated accounting and financial management systems, and agency asset management systems.[53]

Over the next six years, Congress defined and adjusted the efforts of government agencies by enacting the GPRA of 1993, the GMRA of 1994, and the FFMIA and CCA of 1996. These statutes, in addition to those listed in Table 5, provide guidance for standardizing business systems, financial accountability, and economical system investment, as well as creating the positions of the CFO and CIO for each federal agency.[54] However, a 1996 audit of the twenty four federal agencies found only six of the agencies being able to achieve a "clean" audit opinion, with the DoD lagging the group. Furthermore, the same group of agencies were reviewed in 2005 and 75% of the agencies received clean audit opinions, with the DoD being largely cited as the main cause for the government's un-auditable financial statements.[55]

In 1997, the DoN created the Revolution in Business Affairs (RBA) program to transform business processes in the Navy. The RBA board of directors developed the Commercial Financial Practices Working Group (CFP) which lead the DoN's management reform initiatives and commercial financial practices. The CFP later

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[52] U.S. Government Accountability Office, *CFO Act of 1990: Driving the transformation of federal financial management, GAO-06-242T* (Washington, DC: Government Accountability Office, 2005), 1.

[53] U.S. Government Accountability Office, GAO-06-242T, 6.

[54] Office of Management and Budget, "Memoranda 96-20 (Implementation of the information technology management reform act of 1996)," The White House, April 4, 1996, http://www.whitehouse.gov/omb/memoranda_m96-20/.

[55] U.S. Government Accountability Office, GAO-06-242T, 11.

became the CBP. After discussions with industry executives regarding their successes with integrating business processes, the CBP decided that the DoN should invest in ERP software for management integration.[56]

The DoD Enterprise Software Initiative (ESI) was formed in 1998 by the DoD CIOs to leverage DoD's buying power across all commercial enterprise software agreements. In 1999, the first enterprise software agreement (ESA) was awarded for DoD's Joint Technical Architecture.[57] DoD ESI negotiates and manages enterprise software agreements, assets, and policies for all DoD organizations, as well as the United States Coast Guard and the Intelligence community. Today, DoD ESI manages more than 75 ESAs for thousands of software products, including 11 ERP software agreements to satisfy DoD acquisition policies outlined in the Federal Acquisition Reform Act (FARA). DoD ESI estimates they have achieved a cost avoidance of over $3 billion by negotiating as much as 86% off list prices for software, hardware, and services.[58]

Even with the existence of the DoD ESI, the DoN's four pilot programs were allowed to design and execute their own unique ERP programs in order to validate ERP implementation for their assigned management functions. Although the four PM's for the pilots unanimously selected SAP ERP COTS products, each selected different contractors to develop and integrate the software. In December 1998, an Executive Steering Group (ESG) was formed to supervise the four pilot projects, and the programs began implementation preparations in 1999.[59]

SPAWAR awarded their contract to PwC in June 2000 and launched the CABRILLO project in July 2001. NAVSEA awarded their contract to IBM in June 2000 and launched the NEMAIS project in June 2002. NAVSUP awarded their contract to

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[56] U.S. Government Accountability Office, *DOD Business systems modernization: Navy ERP adherence to best practices critical to avoid past failures, GAO-05-858* (Washington, DC: Government Accountability Office, 2005), 11.

[57] Chris Panaro, "DoD ESI Celebrates its 10th Anniversary," *CHIPS* 26, no.4 (October - December 2008): 55.

[58] Panaro, DoD ESI, 54.

[59] U.S. Government Accountability Office, GAO-05-858, 11.

EDS in August 2000 and launched the SMART project in January 2003. NAVAIR awarded a contract to KPMG as the lead contractor in May 2001 and launched the SIGMA project in October 2002.[60]

Re-engineering business processes is a DoD wide initiative and the DoN took the lead on integrating their management systems. Despite the DoD's efforts to improve its accounting and financial management systems, the Government Accountability Office (GAO) has repeatedly scrutinized the DoD's minimally effective control systems. In an effort to promote business process transformation initiatives, the SECDEF established the DoD Financial Management Modernization Program (FMMP) in July 2001 to develop business practices and initiatives that would integrate the 1,200+ DoD financial systems and their 3,500+ interfaces into a single system capable of providing decision makers accurate and timely information.[61] Under the joint sponsorship of the Under Secretary of Defense (Comptroller) and the Assistant Secretary of Defense (Networks and Information Integration), FMMP was renamed the Business Management Modernization Program (BMMP) in May 2003.

After the DoN deployed and evaluated its ERP pilot projects, it was apparent that the pilot programs possessed a fatal flaw; their designs were not compatible with one another. In September 2002, the Assistant Secretary of the Navy for Research, Development, and Acquisition established the Navy ERP Convergence Team to develop an ERP acquisition plan to combine the four pilot programs into one integrated business and management system.[62] In 2003, the Navy ERP Program Office was established to develop and implement a standard Navy-wide ERP architecture utilizing lessons learned from the Navy pilot programs and specific guidance from applicable DoD directives. A

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[60] U.S. Government Accountability Office, *DOD Business systems modernization: Navy ERP adherence to best practices critical to avoid past failures, GAO-05-858* (Washington, DC: Government Accountability Office, 2005), 13.

[61] Paul Tibbits, "Business management moderization program (BMMP) overview," *Defense Acquisition University* (May 12, 2004): 4, http://www.dau.mil/conferences/presentations/2004/GenSessWedTibbits.pdf.

[62] U.S. Government Accountability Office, GAO-05-858, 12.

final DoD evaluation concluded that the Navy ERP pilot programs were successfully executed using COTS software, thus moving the Navy ERP Program into the acquisition process.

In September 2004, Navy ERP became an Acquisition Category (ACAT) I program focused on integrating finance, supply chain, program management, and workforce management data into a single business system to support the modern Navy enterprise.[63] As Navy ERP evolved through the acquisition process, the pilot programs were retired to prepare for the new Navy wide ERP program. The SAP COTS software was retained as the preferred system based on the familiarity with the SAP software and its success in the pilot programs.

The 2005 NDAA reiterated the DoD's focus on business process improvements mandating the development of a DoD Business Enterprise Architecture (BEA), a DoD Enterprise Transition Plan (ETP), and a DBSMC. The DBSMC was established in February 2005 with the Deputy SECDEF as the senior member. The BEA is the DoD's guide to business transformation and the ETP is a management tool used by the various DoD organizations in implementing business transition plans, schedules, and budgets.[64] The DBSMC approves all business system improvements to ensure compliance with BEA and ETP priorities.

On October 7, 2005, the Deputy SECDEF replaced the BMMP with the Defense BTA to guide enterprise business capabilities focused on supporting the sailors and soldiers.[65] Recognized as the central authority for DoD's business transformation and enterprise implementation, the BTA sets integration priorities, issues policy guidance,

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[63] CHIPS, "Interview with Navy ERP Program Manager Ron Rosenthal and Navy ERP Technical Director Susan Keen," *CHIPS* 24, no.4 (October - December 2006): 25.

[64] Enterprise Planning and Investment Directorate (EP&I), "FY 2010 Enterprise transition plan (ETP)," *BTA* (December 2009), http://www.bta.mil/products/etp.html.

[65] Business Transformation Agency, "BEA 7.0," *BTA* (March 12, 2010), http://www.bta.mil/products/BEA_7_0/BEA/html_files/home.html.

establishes system standards, minimizes redundancy, and shifts resources as required in implementing a comprehensive enterprise-wide system for the DoD. The BTA ultimately seeks to provide financial accountability across the DoD.[66]

The annual BEA published by the BTA acts as the guide for defense business system managers. The BEA drives the ETP which is the DoD's plan for a combined defense enterprise architecture. The Defense Financial Improvement and Audit Readiness Plan (FIAR) in conjunction with the ETP ensure the DoD includes financial management and accounting performance improvements in the defense enterprise architecture.

In September 2005, the GAO conducted an independent review of the Navy's ERP initiatives and concluded that the Navy wasted over $1 billion on its pilot programs. The DoN refuted the GAO findings and identified key lessons learned which would directly impact the success of future ERP implementations.[67] First, system users' feedback is fundamental to the detailed requirements development process which ensures the system effectively and efficiently accomplishes all tasks of the organization from the bottom up. Inputs from workers across the entire organizational hierarchy help define needed system capabilities which are included in the program's operational requirements document. Second, the Navy ERP Program Officer must limit the customization of the SAP COTS software to only regulatory specific modifications. The DoN must modify their business practices to accommodate the SAP software. This provides for lower modification costs and allows the COTS software to produce the efficiencies established with the original design specifications.

In addition to writing off the Navy ERP Program as a $1 billion loss, GAO commented on the shortfalls of the DoN pilot projects and identified issues to address to ensure interoperability of the Navy ERP program in the future. Though many of the critical issues regarding the pilot projects (e.g. the pilots' inability to work as an

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[66] Business Transformation Agency, "BEA 7.0," *BTA* (March 12, 2010), http://www.bta.mil/products/BEA_7_0/BEA/html_files/home.html.

[67] U.S. Government Accountability Office, *DOD Business systems modernization: Navy ERP adherence to best practices critical to avoid past failures, GAO-05-858* (Washington, DC: Government Accountability Office, 2005), 50.

integrated system) were already being addressed by the Navy ERP Program Office, the GAO specifically cited four challenges for the DoN to overcome in order for the enterprise-wide system to achieve at least minimal success: (1) systematically address the problem of integrating the large number of data interfaces between ERP and existing legacy systems, (2) ensure proper data conversion from legacy to ERP systems, (3) establish key performance parameters to guide overall ERP system development and implementation, and (4) develop metrics for evaluating cost, schedule and performance factors of the Navy ERP program.[68]

In order to ensure seamless and accurate information exchange from one management system to the next, the DoN must mitigate the inherent risks in integrating the ERP IT system with the large number of legacy systems (4,150 in DoD) by systematically addressing the issues existing at each interface.[69] For example, the Defense Finance and Accounting Service and the U.S. Transportation Command increase the difficulty of supplying real-time asset visibility since their systems already have intrinsic lag in their data transfer and reporting modules without the Navy ERP integration occurring. As the Navy ERP Program is expanded in the future to include Naval Installations Command, aviation and ship depots, and vessels at sea, sustainment and future integration could result in increased cost as their legacy systems age and these commands adapt to operating independently. Also, DoD's Global Information Grid (GIG) will undoubtedly present future hurdles to the Navy ERP Program as DoD attempts to integrate all of DoD's information systems, services, applications, and data into one secure network.[70] Continued integration testing is paramount to ensuring reliable data transfer between DoD's current legacy systems and the future DoD enterprise architecture.

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[68] U.S. Government Accountability Office, *DOD Business systems modernization: Navy ERP adherence to best practices critical to avoid past failures, GAO-05-858* (Washington, DC: Government Accountability Office, 2005), 48.

[69] U.S. Government Accountability Office, GAO-05-858, 33.

[70] U.S. Government Accountability Office, *Defense acquisitions: The global information grid and challenges facing its implementation, GAO-04-858* (Washington, DC: Government Accountability Office, 2004), 29.

The Navy ERP Program Office must ensure accurate and timely conversion of data as it is transferred from legacy systems to the ERP system.[71] If this process is undervalued and improperly executed, it could negatively impact cost, performance, and schedule efficiencies. Time and money would be wasted in both the initial conversion and the rework for the required corrections and testing to guarantee accurate reporting. This task is critical to the overall success of the program and to the level of financial reporting that DoD is planning to achieve.

The DoD's BEA plan has not identified what key performance parameters will be used to lay the foundation for the DoD's enterprise architecture.[72] Without this starting point, the Navy ERP Program Office is potentially designing and implementing a large scale system that may not be compatible with DoD's developmental enterprise architecture. Different business processes and technology standards could result in costly rework for the DoN and the DoD. Periodic assessment of the Navy ERP system by DoD and BTA will be critical to the success of DoD's enterprise architecture.

The DoN lacks the metrics required to assess the performance of their efforts.[73] The Navy ERP Program Office is adhering to the required acquisition guidelines and directives, but the GAO still suggests additional performance, cost, and schedule metrics to identify and reduce risks by providing a quantitative measure of progress. GAO also believes that the Navy ERP Program Office should follow the industry practice of employing an independent third party to assess the progress of the ERP program instead of using DoD and Navy ERP Program in-house subject matter experts. An independent assessment should provide an unbiased opinion of the system's true status.

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[71] U.S. Government Accountability Office, GAO-05-858, 40.

[72] U.S. Government Accountability Office, *DOD Business systems modernization: Long-standing weaknesses in enterprise architecture development need to be addressed, GAO-05-702* (Washington, DC: Government Accountability Office, 2005), 2.

[73] U.S. Government Accountability Office, *DOD Business systems modernization: Navy ERP adherence to best practices critical to avoid past failures, GAO-05-858* (Washington, DC: Government Accountability Office, 2005), 42.

Through 2008, the GAO continued to address the DoD's non-compliance with the BEA requirement of establishing a viable enterprise architecture structure.[74] The DoD needs to define its technical and business process standards which would allow for the determination of system integration efficiencies and identification of potential issues as the BTA moves forward with the enterprise development process. In order to promote further compliance across the entire enterprise, the DoD and BTA need to issue guidance with respect to technical specifications to minimize the duplication of efforts resulting in the waste of funds.[75]

As the DoN continues to develop its ERP acquisition strategy, the DoD is concurrently implementing enterprise architectures, and conducting committee and agency reviews ensuring all defense agencies are aligned with the DoD's SMP. The SMP ensures operations and business initiatives are aligned to support specific performance objectives.[76] The GAO is still concerned with the cost of aligning the DoN's current ERP program with DoD's enterprise architecture since both are being planned and implemented in parallel.[77] The GAO eventually acknowledged the DoN's improved test management structure and system defect supervision. However, the GAO continued to scrutinize the Navy ERP program's lack of an independent audit of their program. The ERP Program Office continues to multi-task their contractors as system release managers and standards appraisers.[78]

The Navy ERP Program is currently managed by PEO-EIS as an ACAT I Information and Communication program. Navy ERP is being deployed across the enterprise in phases using SAP software (Figure 3). Release 1.0 was first deployed at NAVAIR in October 2007 to modify financial and acquisition systems. Release 1.1 was

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[74] U.S. Government Accountability Office, GAO-05-702, 2.

[75] U.S. Government Accountability Office, *DOD Business systems modernization: Long-standing weaknesses in enterprise architecture development need to be addressed, GAO-05-702* (Washington, DC: Government Accountability Office, 2005), 6.

[76] Business Transformation Agency, "BEA 7.0," *BTA* (March 12, 2010), http://www.bta.mil/products/BEA_7_0/BEA/html_files/home.html.

[77] U.S. Government Accountability Office, *DOD Business systems modernization: Navy implementing a number of key management controls on enterprise resource planning system, but improvements still needed, GAO-09-841* (Washington, DC: Government Accountability Office, 2009), 10.

[78] U.S. Government Accountability Office, GAO-09-841, 5.

deployed at NAVSUP in March 2010 to merge wholesale and retail supply functions. Release 1.2 was scheduled for deployment in the fall of 2010 to integrate maintenance applications, but is no longer part of the Program of Record.[79] Future Templates and their corresponding releases will be deployed to integrate evolving management capabilities (e.g., property and contract management).

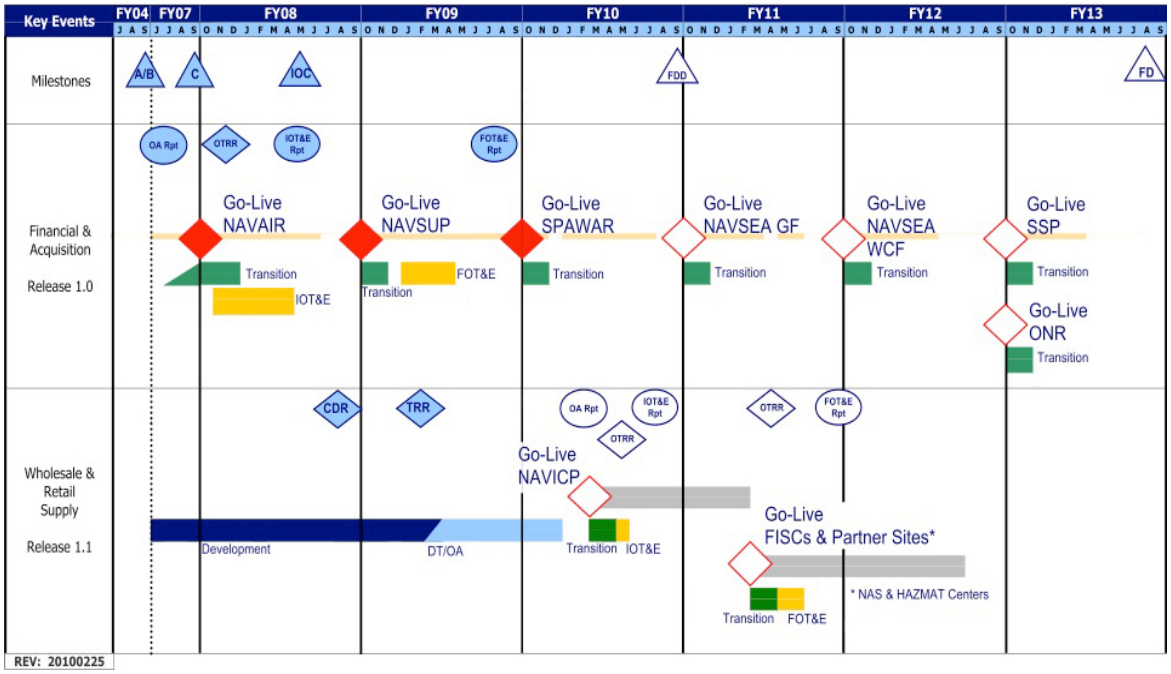

Figure 3. Navy ERP Program Schedule[80]

The difficult but successful deployment of Release 1.0 at NAVAIR set the foundation for the entire Navy ERP system which is one of the world's largest public sector implementations.[81] Release 1.0 will perform broad acquisition and financial functions starting with Echelon II and III commands to include General Fund (GF) & Navy WCF financial management, procurement, workforce management, and

[79] The Assistant Secretary of the Navy for Research, Development and Acquisition, "Navy Enterprise Resource Planning Critical Change Team Report" (Washington, DC: Author, 2009).

[80] Navy ERP Program Office, "Navy ERP deployment info," Navy ERP Program, http://www.erp.navy.mil/deployment_info.html.

[81] Navy ERP Program Office, "Navy ERP achieves initial operation capability," *Defense AT&L*, (September-October 2008), http://findarticles.com/p/articles/mi_m0QMG/is_5_37/ai_n31064821/?tag=content;col1 (accessed May 24, 2010).

program/project management. Release 1.0 was awarded to BearingPoint, Inc as the prime integrator of the SAP software. As of June 1, 2010, BearingPoint is converting and resolving issues with legacy Navy WCF data as it begins transitioning the data into the Navy ERP system.[82] NAVAIR, NAVSUP, and SPAWAR are running Release 1.0 with NAVSEA GF scheduled to execute their transition early in fiscal year (FY) 2011.

Release 1.1 tackles the function of wholesale and retail supply by integrating the supply chain management functions of planning, allowancing, procurement, repair of repairables, and order fulfillment into the Navy's enterprise system. Release 1.1 is designed to be the Navy's single supply solution built on Release 1.0's foundation to ensure compatibility.[83] It retires a myriad of legacy supply systems which stove-piped inventory and transaction visibility. Release 1.1 offers decision makers improved planning and forecasting which reduces sourcing requirements and reduces excessive safety inventory. Improving forecasts and reducing inventories are essential to addressing the DoD's highly publicized lack of financial management controls and auditable financial statements.[84] Release 1.1 was awarded to IBM as the prime integrator. As of June 1, 2010, IBM is focused on weapon systems data integration at Naval Inventory Control Point (NAVICP).[85] Fleet & Industrial Supply Centers (FISC) are schedule to begin converting their legacy supply systems to the Navy's enterprise system in FY 2011. Figure 4 highlights the progression of Navy ERP.

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[82] Navy ERP Program Office, Navy ERP achieves IOC, 1.

[83] Navy ERP Program Office, "Navy ERP deployment info," Navy ERP Program, http://www.erp.navy.mil/deployment_info.html.

[84] U.S. Government Accountability Office, *DOD Business systems modernization: Key navy programs' compliance with DOD's federated business enterprise architecture needs to be adequately demonstrated, GAO-08-972* (Washington, DC: Government Accountability Office, 2008), 15.

[85] Navy ERP Program Office, "Navy ERP achieves initial operation capability," Defense AT&L, (September-October 2008), http://findarticles.com/p/articles/mi_m0QMG/is_5_37/ai_n31064821/?tag=content;col1.

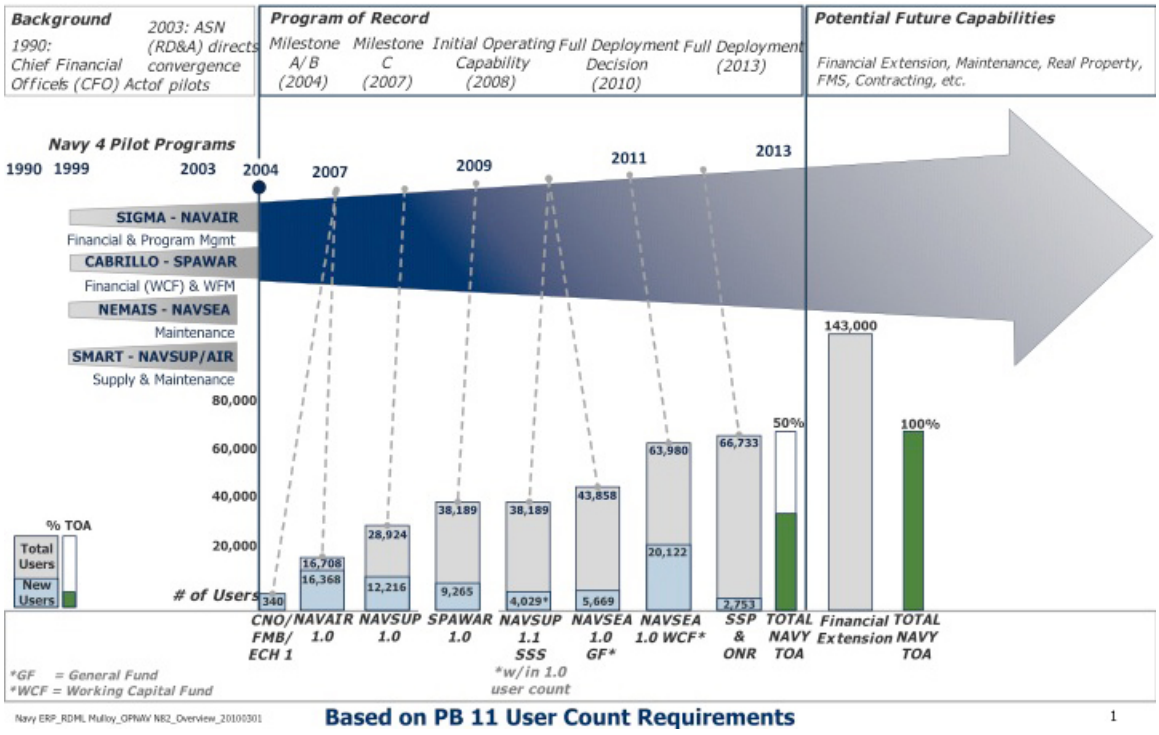

Figure 4. Navy ERP Timeline[86]

[86] Navy ERP Program Office, "Navy ERP Timeline," Navy ERP Program, http://www.erp.navy.mil/timeline.html.

IV. PUBLIC VS. PRIVATE SECTOR IT MANAGEMENT CHALLENGES

A. RESEARCH FRAMEWORK FOR PUBLIC SECTOR ORGANIZATIONS

The implementation of an ERP system is a significant undertaking for any organization. Properly recognizing and addressing the challenges in deploying ERP IT systems in public sector organizations requires an understanding of: (1) the differences between public sector and private sector organizations, and (2) how those differences affect an organization's IT decision making and policy formulation. Compared to the private sector, the public sector faces even greater challenges because a majority of the empirical research and best practices stem from private sector IT implementation research. A review of the literature by Y.B. Moon suggests significant research in ERP over the last decade, but with a still maturing emphasis on ERP in public sector organizations.[87]

Barry Bozeman and Stuart Bretschneider propose differences between the public and private sectors, and that those differences should be accounted for in the management of IT systems within each sector. The research, theories, and best practices of the time dealt primarily with private sector organizations, and thus we note the applicability and implementation of private sector-based solutions in addressing public sector IT issues.[88] However, the key is determining which solutions are applicable for public sector IT issues.

The framework for researching and solving private sector IT management issues may not be applicable to public sector IT management issues. For instance, the private sector framework does not account for the effects of an organization's external environment. The deficiency makes the private sector framework suspect in its

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87 Young B. Moon, "Enterprise Resource Planning (ERP): a review of the literature," *International Journal of Management and Enterprise Development* 4 , no. 3 (2007): 235–264, http://ime.syr.edu/PDF%20files/Moon%202007.pdf.

88 Barry Bozeman and Stuart Bretschneider, "Public Management Information Systems: Theory and Prescription," *Public Administration Review* (Blackwell Publishing) 46, no. Special issue: Public ManagementIinformation Systems (November 1986): 475–487, http://www.jstor.org/stable/975569?origin=JSTOR-pdf.

applicability to public sector organizations, which are strongly influenced by external environmental factors.[89] The interrelationships between internal organizational entities and external actors who possess decision making and policy formulation rights must be addressed when examining public sector entities.

To address the sector differences, Bozeman and Bretschneider developed a framework for differentiating between private and public sector organizations in order to identify sector specific issues of IT management and implementation. A hybrid model was formed using existing literature and four models of publicness: Economic Authority, Political Authority, Personnel and Personnel Systems, and Work Context model. A broad application of the framework across several entities in each sector reveals traits that could distinguish public from private organizations (Table 6).[90] The distinguishing variables thus provide a baseline for conducting analysis of public sector-specific IT issues in future research.

Since the development of the Bozeman and Bretschneider framework, empirical research on *private* sector IT systems has grown at a vigorous pace, but work in the field of *public* sector IT management and implementation has lagged. However, several studies have identified common differences between the public and private sector, and substantiate the initial claims of Bozeman and Bretschneider .

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89 Barry Bozeman and Stuart Bretschneider, "Public Management Information Systems: Theory and Prescription," *Public Administration Review* (Blackwell Publishing) 46, no. Special issue: Public ManagementIinformation Systems (November 1986): 475, http://www.jstor.org/stable/975569?origin=JSTOR-pdf.

90 Bozeman, Public Management Information Systems, 477–480.

Publicness Model	Distinguishing Variables
Economic Authority Model	1. Market Failure a. Poor Information b. Breakdowns in Competition c. Transaction Costs d. Externalities and Public Goods 2. Property Rights a. Input of Entrepreneurs and Wealth Sharing Managers b. Inability to Transfer Ownership in the Public Sector
Political Authority Model	1. Legal and Constitutional Structure a. Fragmentation and Interdependency b. Representatives and Electoral Process c. Individual Rights 2. Social Psychological Sources of Authority a. Public Expectations, Public Interest b. Civic Responsibility of the Individual
Work Context Model	1. Time Frame 2. Political Cycles 3. Media Attention 4. Crisis Attention 5. Accountability and Monitoring
Personnel Model	1. Personnel Systems and Incentives 2. Motivation, Job Satisfaction 3. Red Tape and Formalism 4. Self-Selection

Table 6. Four Models of Publicness: A Summary of Propositions[91]

B. DIFFERENCES BETWEEN PRIVATE AND PUBLIC SECTOR IT PRACTICES

Bruce Rocheleau's critical review of the empirical research to date on private and public sector IT systems serves to consolidate the existing points of view within the research field, and evaluate the Bozeman and Bretschneider management information systems framework.[92] An analysis of the various sector identifying characteristics suggests many similarities do exist between public and private sector (Figure 5), hence the logical adoption of ERP IT systems by public sector entities. [93]

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91 Barry Bozeman and Stuart Bretschneider, "Public Management Information Systems: Theory and Prescription," *Public Administration Review* (Blackwell Publishing) 46, no. Special issue: Public ManagementIinformation Systems (November 1986): 480, http://www.jstor.org/stable/975569?origin=JSTOR-pdf.

92 Bruce Rocheleau, *Public ManagementIinformation System* (Hershey, PA: Idea Group Publishing, 2006), 3.

93 Sharon L. Caudle, Wilpen L. Gorr, and Kathryn E. Newcomer, "Key Information Systems Management Issues for the Public Sector," *MIS Quarterly* 15, no. 2 (June 1991): 171–188, http://www.jstor.org/stable/249378?origin=JSTOR-pdf.

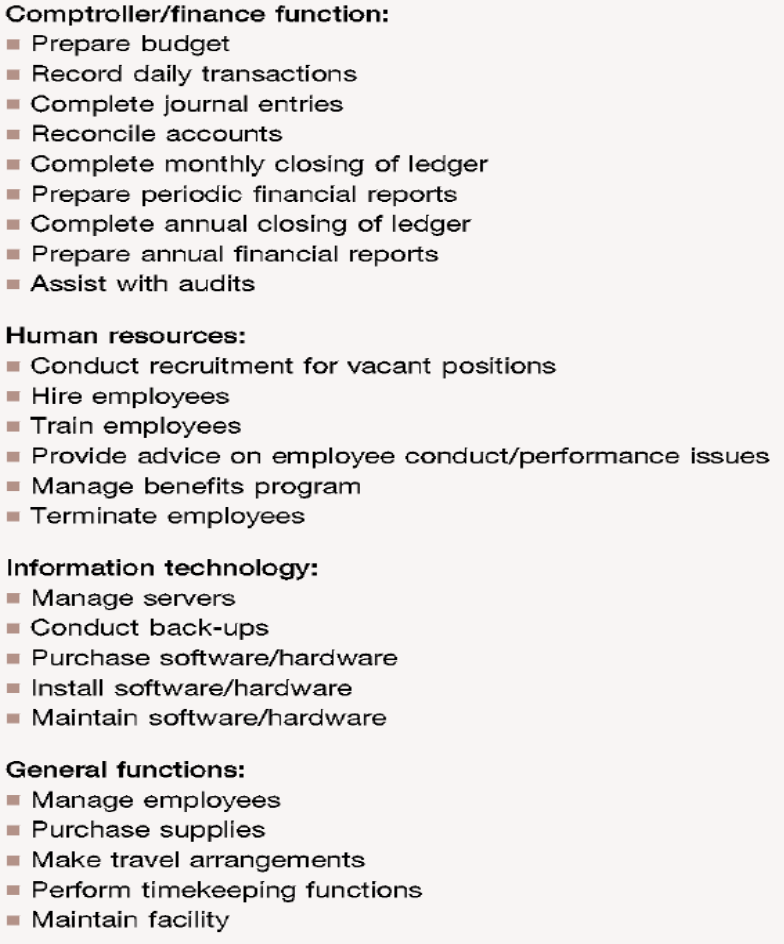

Figure 5. Examples of Common Activities in Organizations[94]

Yet there are key differences that directly affect public sector management of IT systems, and therefore should be addressed in strategic planning and implementation of governmental IT systems. The proposed differences are as follows:

- Public sector has greater concern with accountability, openness, and representativeness than the private sector [95]

94 Kenneth J. Euske, "Public, private, not-for-profit: everybody is unique?," *Measuring Business Excellence* 7, no. 4(July 2003): 5–11, http://www.emeraldinsight.com/journals.htm?issn=1368-3047&volume=7&issue=4&articleid=843755&show=html&PHPSESSID=hdv4ge9rgjusj473s0hut52ig2 (accessed on June 14, 2010).

95 Barry Bozeman and Stuart Bretschneider, "Public Management Information Systems: Theory and Prescription," *Public Administration Review* (Blackwell Publishing) 46, no. Special issue: Public ManagementIinformation Systems (November 1986): 482, http://www.jstor.org/stable/975569?origin=JSTOR-pdf.

- Public sector IT systems have greater focus on vertical and external linkages than the private sector [96]
- Greater legal constraints and political influences for public sector organizations [97]
- Higher risk aversion due to greater scrutiny of public sector business practices [98]
- Greater complexity in objectives and goals of public sector organizations [99]
- Fewer, if any, incentives for high level of performance in public sector organizations [100]
- Differences in worker job satisfaction, motivation, and commitment between the sectors [101]
- Different approaches to decision making within each sector [102]

Ongoing research acknowledges that the private and public sector differences above are still open for debate. Some of the concerns are: (1) both private and public organizations exhibit some degree of publicness; (2) each of the differences is not entirely public in nature; (3) the growing trend of public and private sector entities exhibiting common characteristics and goals; and (4) the ambiguity in how the term public is defined and applied.[103] Also, public sector objectives vary depending on the level of government and management being observed, thus differences between public

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[96] Bozeman, Public Management Information Systems, 475–482.

[97] Center for Technology in Government, "Making Smart IT Choices," *University at Albany-State University New York*, (September 1996), http://demo.ctg.albany.edu/publications/guides/making_smart_it.

[98] Center for Technology in Government, Making Smart IT Choices.

[99] Sharon L. Caudle, Wilpen L. Gorr, and Kathryn E. Newcomer, "Key Information Systems Management Issues for the Public Sector," *MIS Quarterly* 15, no. 2 (June 1991): 172–173, http://www.jstor.org/stable/249378?origin=JSTOR-pdf.

[100] B. J. Reed, "Strategic Information Systems Planning in U.S. State Governments: States and Prospects," *CiteseerX*, Edited by Syracuse University, governmental performance project, learning paper series The Maxwell School, (August 2000), http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.93.6956&rep=rep1&type=pdf.

[101] Hal G. Rainey, "Public Agencies and Private Firms: Incentive Structures, Goals, and Individual Roles," *Administration and Society* (Sage Publications, Inc.) 15, no. 2 (August 1983): 227–233, http://aas.sagepub.com/cgi/content/abstract/15/2/207.

[102] Paul C. Nutt, "Public-Private Differences and the Assessment of Alternatives for Decision Making," *Journal of Public Administration Research and Theory: J-Part* (Oxford University Press) 9, no. 2 (April 1999): 305–349, http://www.jstor.org/stable/1181809?origin=JSTOR-pdf.

[103] Barry Bozeman, *All Organizations arePublic* (Washington, DC: Beard Books, 1987), 1–7.

and private organizations must be stated contingently based on these two variables.[104] However, our review of the existing body of knowledge suggests enough empirical evidence exists to support using the differences listed above in examining implementation issues of the DoN IT enterprise system.

C. RESEARCH FRAMEWORK FOR ANALYZING THE PUBLIC SECTOR CHARACTERISTICS OF THE DON

Even among other public sector organizations, the DoN possesses unique characteristics to consider in developing an IT governance framework. Drawing from the presented theories, we establish a framework for examining the unique public sector characteristics of the DoN. The framework takes a policy level view, focusing on areas affecting executive level decision-making. The following areas represent the core of our framework for examining the unique characteristics of the DoN: (1) Strategic Vision/Goals; (2) Culture; (3) Structure; and (4) Political Influence (Table 7).

DoN Focus Areas	DoN Characteristics/Traits
Strategic Vision/Goals	(1) Goal Clarity (2) Business vs. Non-Business Goals (3) Enterprise vs. Unit (4) Modernization vs. Transformation (5) Leadership
Structure	(1) Rank vs. Position/Billet (2) Vertical Orientation/Stovepipe (3) Roles and Accountability (4) Decision Making
Culture	(1) Warfare Communities (2) Motivation, Job Satisfaction (3) Organizational vs. Unit (4) Accepted Behaviors (5) Established Standards/Work Practices
Politcal Influence	(1) Internal & External Policy Regulation (2) Political Cycles/Processes (3) Formal Programs (4)Transparency

Table 7. DoN Public Sector Characteristics Framework

[104] Sharon L. Caudle, Wilpen L. Gorr, and Kathryn E. Newcomer, "Key Information Systems Management Issues for the Public Sector," *MIS Quarterly* 15, no. 2 (June 1991): 179–181, http://www.jstor.org/stable/249378?origin=JSTOR-pdf.

The DoN is a non-profit organization with a non-business focused strategic vision, "The mission of the Navy is to maintain, train and equip combat-ready Naval forces capable of winning wars, deterring aggression and maintaining freedom of the seas."[105] This leads us to an analysis of several aspects: (1) who owns the enterprise IT system and provides the leadership to promote the program; (2) does the Navy ERP Program have an appropriate strategic vision; and (3) the potential difficulty in defining enterprise-wide IT business transformation goals and objectives in the non-business environment of the DoN.

Culture can be observed in the language, customs, problem solving methods, and uses of technology that are established by a group of people through social interaction in order to deal with the challenges presented by the surrounding environment.[106] The DoD is a culture comprised of the unique sub-cultures of the various service branches and defense agencies, and is further subdivided into sub-cultures in the service branches. Within our framework we examine the affects of the DoN sub-cultures (e.g. warfare communities, subspecialties, commands and organizations) on the implementation of an enterprise IT governance structure. The cultural tendencies identify two key components affecting IT governance: (1) values that identify preferences for specific behaviors and outcomes, and (2) norms that dictate acceptable behaviors.[107]

The structural concepts we focus on are: (1) the vertical orientation of the department (i.e., chain of command and existing stovepipes); (2) rank vs. positional authority; and (3) decision-making rights and authority. Each concept is not unique to the DoN. However, their cumulative effect along with the size and complexity of the DoN potentially influence any type of governance within the department and warrant further investigation.

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105 Department of the Navy, *NAVY Organization - A look at the Organization of the U.S. Navy,* (November 1, 2010), http://www.navy.mil/navydata/organization/org-top.asp.

106 National Defense University, *Strategic Leadership and Decision Making,* (October 1, 2010): 17, http://www.au.af.mil/au/awc/awcgate/ndu/start-ldr-dm/pt4ch16.html.

107 National Defense University. Strategic Leadership, 15.

The DoD and DoN are influenced by a myriad of policy, regulation, and statute. Key legislation (Table 5) in concert with congressional authorization and appropriation acts establishes requirements to meet the financial reporting needs of government oversight and regulatory bodies (i.e., OMB, DoD IG, GAO, and Congress). This potentially results in competition with the priorities and goals in DoN directives. Furthermore, the DoN participates in the Planning, Programming, Budgeting, and Execution (PPBE) process and as a result is subject to a level of scrutiny and transparency unlike any in the private sector.

Each area will be reviewed individually and collectively in order to understand the possible effects on establishing an appropriate governance structure. Though represented by individually listed characteristics, the characteristics are not mutually exclusive. Therefore we posit that a characteristic may surface within other areas, and that the more times a characteristic is acknowledged across the different areas the greater its effect on the governance of the Navy ERP Program.

V. GOVERNANCE THEORY

A. DEFINITION OF IT GOVERNANCE

The many views of governance obscure an already vaguely defined concept. Thus, when applied to the rapidly changing field of technology, the meaning of IT governance is only further complicated by the interpretations of researchers in the IT field of study. The basic concepts underlying the theory behind IT governance, and an acceptable definition must be presented as a starting point for any constructive discussion of a system's control environment.

In Merriam Webster's Dictionary, governance is simply defined as government[108], with government itself relating to the exercise of authority over and by political units throughout an organization, or agency, in an effort to provide authoritative direction or control.[109] However, governance is not simply the exercise of authority and the outcome of the rules of law of a government system. Governance goes further in identifying the interrelationships that exist among the various actors, and how these interactions create an internally regulated governing framework.[110] The governing processes of an organization are directly influenced by the perceptions, motivations, and beliefs of those who internally control the system.

Bjoern Niehaves et al. stated, "An IT consulting project can thus be perceived as an institutional arena for political activities where particular actors, who include management, employees and consultants, negotiate and promote their own interests."[111] Implementing an enterprise-wide IT system undoubtedly results in changes to the technological framework of an organization. However, the accompanying sociopolitical changes that must occur for a successful implementation are often overlooked. Little

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108 *Merriam Webster Online*, s.v. "Governance," http://www.merriam-webster.com/dictionary/governance (accessed September 26, 2010).

109 *Merriam Webster Online*, s.v. "Government," http://www.merriam-webster.com/dictionary/government (accessed on September 26, 2010).

110 Gerry Stoker, "Governance as theory: five propositions," *International Social Science Journal* (Blackwell Publishers) 50, no. 155 (March 1998): 17.

111 Stoker, Governance as theory, 17.

focus is placed on understanding the effect of politics on large scale IT projects. The varying reasons behind the actions of all the people with a role in the implementation must be considered.[112]

Attempts to regulate a strategic IT system by people external to an organization can fail for a number of reasons: (1) operational problems due to inadequate assessment of implementation capabilities; (2) a disregard for the norms, values and motivations of internal implementers; (3) external regulators lack of internal system knowledge; and (4) internal regulatory actions countering external regulators.[113] Therefore, IT governance processes should account for internal and external regulation by actors in and out of an organization, and their underlying motivations. This perspective challenges the idea that regulators of a system can be viewed as external to the system, and suggests a re-framing of the system to include all personnel who can influence the system.[114]

IT governance is not about the day-to-day decisions associated with mid-level management. IT governance revolves around higher level influences on the existing organizational culture, policy establishment, and strategic direction.[115] An IT governance framework should not exist independently from the organization's existing governance structure, but should be incorporated into the existing control framework. Furthermore, for any implementation effort, two facets of IT governance should be specifically addressed: (1) the assigning of decision-making authority and accountability to specific groups/individuals, and (2) the establishment of applicable rules and control structure for the project.[116] The value in understanding the governance perspective of an organization leads to greater understanding in how governance processes change within an organization.

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112 Gerry Stoker, "Governance as theory: five propositions," *International Social Science Journal* (Blackwell Publishers) 50, no. 155 (March 1998): 17.

113 Bjoern Niehaves, Karsten Klose, and Joerg Becker, "Governance Theory Perspectives on IT Consulting Projects: The Case of ERP Implementation," *e-Service Journal* (Indiana University Press) 5, no. 1 (2006): 8.

114 Niehaves, Governance Theory Perspective, 5.

115 Phyl Webb, Carol Pollard, and Gail Ridley, "Attempting to Define IT Governance: Wisdom or Folly?," *Proceedings of the 39th Hawaii International Conference on System Sciences*, January 2006, 2.

116 Nick Robinson, "IT excellence starts with governance," *Journal of Investment Compliance* (Emerald Group Publishing Limited) 6, no. 3 (2005): 48.

Taking these factors into consideration, we adopted the Weill and Ross definition of IT governance as, *"Specifying the framework for decision rights and accountabilities to encourage desirable behavior in the use of IT"*.[117] In this interpretation, desirable behaviors are those that support the culture, norms, and overarching strategy of the organization, and as such must examine the values of those people affected. Additionally, the concept of creating a framework for who makes the different types of decisions, who provides inputs for each decision point, and how these people are held accountable brings together the idea of re-framing the view of an organization to include all people involved.[118]

B. WEILL AND ROSS IT GOVERNANCE MODEL

Some level of IT governance exists across all organizations and industries. The plethora of viable solutions that could be implemented begs the question of what is the ideal solution. In truth, the acceptable answer is that it depends on the organization, its goals, culture, size, etc., and therefore requires a deliberate, systematic approach to determine the best governance framework.

Peter Weill and Jeanne Ross provide a tool for analyzing and developing an organization's IT governance framework. Their IT governance study included 256 multiple business unit enterprises (encompassing both for-profit and non-profit entities) in 23 countries spanning across the Americas, Europe, and Asia Pacific.[119] The initial results revealed that successful enterprise initiatives actively pursued the business benefits of IT in the following ways:[120]

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117 Peter Weill, *Don't Just Lead, Govern: How Top Performing Firms Govern IT*, Working Paper #341, Sloan School of Management, Massachusetts Institute of Technology, Cambridge, MA: Center for Information Systems Research, March 2004, 2.

118 Weill, Don't Just Lead, 2–3.

119 Peter Weill and Jeanne Ross, "A Matrixed Approach to Designing IT Governance," *MIT Sloan Management Review* 46, no. 2 (January 2005): 28.

120 Weill, Don't Just Lead, 2.

- Clearly define the business strategy.
- Specifically outline IT's role in achieving the business strategy.
- Measure and manage the amount spent and value received from IT.
- Establish organizational practices to blend IT into the business strategy.
- Determine the organizational changes required to achieve the benefits from the new IT capabilities.
- Determine accountability for implementing organizational changes.

The Weill and Ross methodology emphasizes two main areas: major decision-making domains and typical IT decision-making approaches. The major decision-making domains (Figure 6) can be viewed at any level throughout an organization (i.e., C-level

IT principles	**High level statements about how IT is used in the business**	Davenport, Hammer & Metsisto 1989, Broadbent & Weill 1997
IT architecture	**An integrated set of technical choices to guide the organization in satisfying business needs. The architecture is a set of policies and rules for the use of IT and plots a migration path to the way business will be done (includes data, technology, and applications)**	Keen 1995, Ross 2003
IT infrastructure strategies	**Strategies for the base foundation of budgeted-for IT capability (both technical and human), shared throughout the firm as reliable services, and centrally coordinated (e.g., network, help desk, shared data)**	Keen 1989, Weill, Subramani & Broadbent 2002
Business application needs	**Specifying the business need for purchased or internally developed IT applications**	Earl 1993
IT investment and prioritization	**Decisions about how much and where to invest in IT including project approvals and justification techniques**	Devaraj & Kohli 2002, Ross & Beath 2002

Figure 6. Five Major IT Decisions[121]

[121] Peter Weill, *Don't Just Lead, Govern: How Top Performing Firms Govern IT*, Working Paper #341, Sloan School of Management, Massachusetts Institute of Technology, Cambridge, MA: Center for Information Systems Research, March 2004, 4.

executive, business unit, or functional). Therefore, to hold managers accountable for the results, the preliminary discussion should identify how the organization corresponds with the context of the domains and then establish who will make the decisions and be held accountable for the different decision-making domains.[122]

Once decision making or input rights for a domain are determined, Weill and Ross use political archetypes to describe the variety of decision making combinations that can be deployed, Figure 7.[123] Depending on the cultural norms, existing governance structures, business goals, etc., an organization will need to determine the best approaches to implement within its IT governance structure. A number of approaches may be used as dictated by the needs and goals of the organization.

Decision rights or inputs rights for a particular IT decision are held by:		CxO Level Execs	Corporate IT and/or Business Unit IT	BU Leaders or Biz process Owners
Business Monarchy	A group of, or individual, business executives (i.e., CxOs). Includes committees comprised of senior business executives (may include CIO). Excludes IT executives acting independently.	✓		
IT Monarchy	Individuals or groups of IT executives		✓	
Feudal	Business unit leaders, key process owners or their delegates			✓
Federal	C level executives and at least one other business group (e.g., CxO and BU leaders)—IT executives may be an additional participant. Equivalent to a country and its states working together.	✓	✓	✓
		✓		✓
IT Duopoly	IT executives and one other group (e.g., CxO or BU leaders)	✓	✓	
			✓	✓
Anarchy	Each individual user			

Figure 7. IT Governance Archetypes[124]

[122] Peter Weill and Jeanne Ross, "A Matrixed Approach to Designing IT Governance," *MIT Sloan Management Review* 46, no. 2 (January 2005): 27.

[123] Weill, A Matrixed Approach, 27.

[124] Peter Weill, *Don't Just Lead, Govern: How Top Performing Firms Govern IT,* Working Paper #341, Sloan School of Management, Massachusetts Institute of Technology, Cambridge, MA: Center for Information Systems Research, March 2004, 5.

The result is a one page matrix cross referencing the decision-making domains, input/output rights, and decision-making approaches, Figure 8. With this tool, the organization can analyze and communicate where IT decisions are made, and determine the location and type of governance mechanisms required to support the enterprise objectives.[125] Utilizing this model, we will examine the existing Navy ERP Program governance structure and attempt to identify areas for potential improvement.

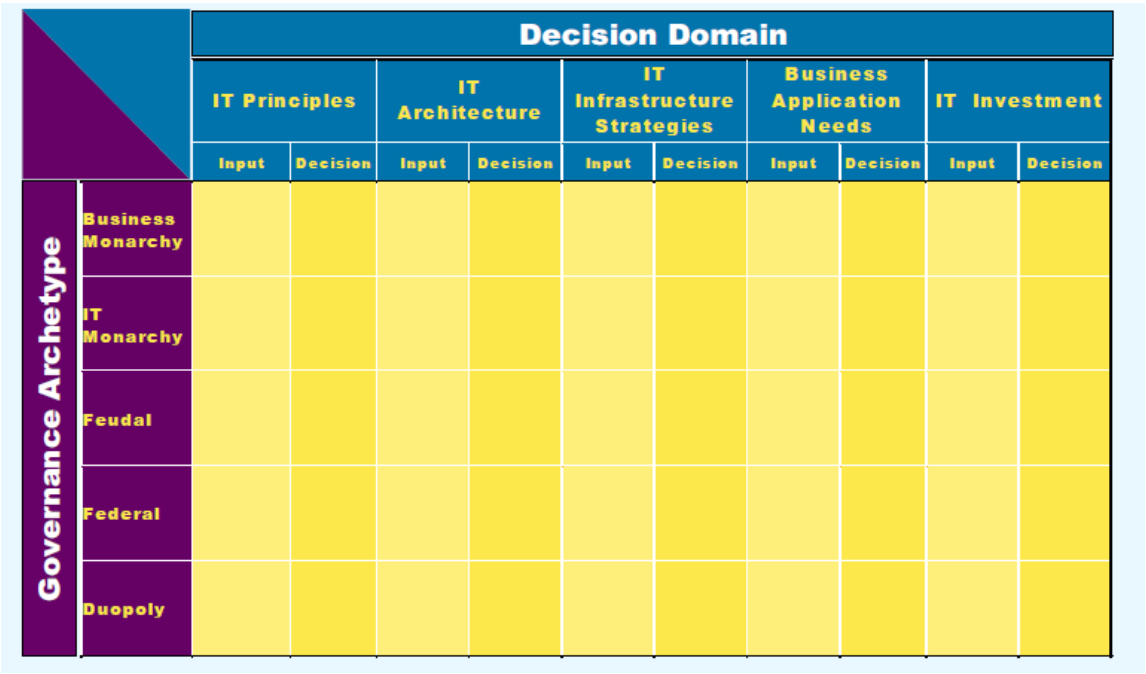

Figure 8. IT Governance Matrix[126]

[125] Peter Weill and Jeanne Ross, "A Matrixed Approach to Designing IT Governance," *MIT Sloan Management Review* 46, no. 2 (January 2005): 28.

[126] Weill, A Matrixed Approach, 33.

VI. ANALYSIS

Analyzing the public sector characteristics of the DoN with our framework provided the basis for our SME interviews. Our research data was corroborated by the interview responses and trends within the governance of the program emerged during the course of our interviews. The results are presented in the next three sections. The first section utilizes our analysis framework (Table 7) to examine the public sector characteristics of the DoN that could impact the governance of the Navy ERP Program. The second section uses the Weill and Ross model for governance to analyze the specific characteristics of the Navy ERP governance structure as it exists today. The third section discusses best practices within the program.

A. DON PUBLIC SECTOR CHARACTERISTIC FRAMEWORK

1. Strategic Vision/Goals

The DoD lacks a comprehensive strategic plan for its business transformation efforts.[127] The efforts have focused on modernizing business systems vice BPR required for transformation of the department's business practices.[128] However, the DoD has made some progress in establishing a business enterprise architecture and the associated corporate policies, rules and standards, while the DoN has not fully committed itself to developing an adequate business enterprise architecture or transition plan and is thus minimally effective in guiding its enterprise-wide decisions. [129] Our respondents agreed that a strategic business vision does not exist with regards to Navy ERP, and that establishing an effective governance structure is mutually dependent on developing a strategic focus emphasizing an enterprise level perspective of BPR.

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[127] U.S. Government Accountability Office, *Defense Business Transformation: Achieving Success Requires a Chief Management Officer to Provide Focus and Sustained Leadership, GAO-07-1072* (Washington D.C.: Government Accountability Office, 2007), 1.

[128] U.S. Government Accountability Office, GAO-07-1072, 3.

[129] U.S. Government Accountability Office, *DOD Business Systems Modernization: Progress in Establishing Corporate Management Controls Needs to Be Replicated in Military Departments, GAO-08-705* (Washington D.C.: Government Accountability Office, 2008), 4.

Goal clarity is the linchpin of strategic planning which aligns an organization's efforts in pursuing prioritized objectives. In that context, strategic planning for enterprise-wide IT systems must be incorporated into the development of the organization's goals, rather than IT systems being regulated to fulfill requirements or objectives which precluded the IT enterprise.[130] The lack of an enterprise perspective resulted in the four Navy pilot programs designing and executing their own unique ERP program in order to validate ERP implementation for their assigned management functions. Ultimately, the pilot programs were not compatible with one another which defeated the logic behind instituting a single, enterprise-wide system to provide real-time information for all units within the organization.

A trait of successful IT investment decision making is sustained executive leadership which can overcome cultural resistance, ensure adequate resources, and garner top management support and understanding.[131] DoN does not have a single owner of the business enterprise requirements. As a result, the DoN is unable to develop an end-to-end enterprise level view of its business processes in order to standardize the business of the DoN. As a military organization without a common business vision, standard business processes, or an owner for enterprise requirements, the DoN IT governance structure is relegated to making business decisions by committee. Furthermore, our SME responses added that the number of groups that must be represented in these governing bodies leads to a slow, ineffective decision-making mechanism in which you agree to disagree and move forward by consensus. Another key point made by several SME was that the governing bodies, with respect to Navy ERP, are primarily advisory and carry no authority to force compliance throughout the various domains.

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130 B. J. Reed, "Strategic Information Systems Planning in U.S. State Governments: States and Prospects," *CiteseerX*, Edited by Syracuse University, governmental performance project, learning paper series The Maxwell School, (August 2000), http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.93.6956&rep=rep1&type=pdf.

131 U.S. Government Accountability Office, *DOD Business Systems Modernization: Military Departments Need to Strengthen Management of Enterprise Architecture Programs, GAO-08-519* (Washington, D.C.: Government Accountability Office, 2008), 4.

2. Structure

Not unlike companies in the private sector, the DoN is a stove-piped organization. The stovepipes of the DoN are inherently aligned with the military chain of command, and as a result will always exist to some extent. Stovepipes inhibit effective horizontal interaction and prevent the development of a horizontally oriented, end-to-end enterprise perspective. In the case of an enterprise IT business system, mitigating the enterprise aspect results in another stand-alone IT database.

The chain of command also presents a unique dichotomy to consider in assigning appropriate and sufficient decision-making authority and responsibilities within a governance structure. The DoN outlines roles and responsibilities based on rank and or positional authority. The complexity of the DoN structure can result in the two factors opposing one another where an individual with positional authority requires compliance from an equal or senior ranking member. An example provided by one SME was the inability of the Principal Deputy-Assistant Secretary of the Navy of Research, Development, and Acquisition, a rear admiral at the time, to force compliance from a SYSCOM commander, a vice-admiral, because of inadequate authority vested in the position and provided by rank. Our SME agree that appropriate forcing functions to hold people accountable are required to establish an effective governance structure.

The DoN is a decentralized decision-making organization which provides a significant amount of autonomy for its commanding officers in the field. The amount of latitude for our commanders provides the most efficient and effective decision-making format from a military perspective, but can be detrimental when attempting to conduct BPR efforts which are normally seen as back office functions. Local controls within DoN organizations inhibit efforts to standardize business processes horizontally across the enterprise. The multi-faceted complexity of the DoN chain of command gives rise to numerous governance structures existing across the enterprise, all the way down to the unit level, which results in significant overlap when attempting to integrate IT capabilities across the enterprise.

Furthermore, several SME alluded to the fact that the Navy ERP governance structure cannot be separated from the inherent structure of the DoN. Therefore, in designing an IT governance structure within the existing structure of the DoN, any structural and cultural challenges should be specifically addressed when determining decision-making rights within the program. A majority of our SME indicated an enterprise business office in conjunction with sustained high-level leadership could be a solution to this concern. While executive leadership establishes the vision and maintains the authority to hold people accountable, the enterprise business office would be the actual body that executes the vision across the entire enterprise. The enterprise business office would focus on the end-to-end business process requirements ensuring cross-functionality throughout the enterprise, as the executive level leadership ensured compliance from the stakeholders.

3. Culture

The stove-pipes in the DoN are not only aligned through domains, but warfare communities, subspecialties, and individual commands. In the private sector, a company must understand its cultures, norms, and values in order to initiate a successful change management plan. In comparison, the DoN must consider the culture of the Navy as a whole along with its numerous sub-cultures. As one person indicated, "we wanted the benefits of an integrated system, but we implemented a disintegrated system"[132] which optimizes within each domain thereby sub-optimizing the overall enterprise. The ERP technology is capable of integrating many processes (e.g., finance, logistics, and acquisition) into a shared database, thus "the big question is if the Navy is ready for an enterprise system and all that it means?"[133]

From aviation to surface to sub-surface, each community has deeply rooted norms and values established by history and tradition. As a result, different standards of behavior and work practices are evident across all levels of the DoN, further polarizing efforts to establish standard business processes across the enterprise. As one interviewee

[132] Interview with authors, November 9, 2010.

[133] Interview with authors, November 9, 2010.

pointed out, "…the people responsible for maritime maintenance are going to want all the determinations and control over what they do and the people for aviation are going to do the same thing. To get them to sit side-by-side and try to create a set of processes that both will live by, they may shake their head up and down, but inside they are saying there is no way we can do it the same way."[134]

Competition for limited resources within the DoN requires commands to focus on how they can maximize resources within their cognizance. This produces internally established business and work practices that maximizes a command's level of efficiency. However, these practices may not return the same benefits at an enterprise level. Furthermore, many of these unit-level norms are deeply ingrained within the standard operating procedures and present barriers to implementing an enterprise-wide IT management system. As several SME pointed out, commands would continuously attempt to adapt Navy ERP to their internally established practices seeking to reap the same internal efficiencies, and when unable to do so cite issues with the ERP Program. The idea of creating efficiency for the entire enterprise was a concept not aligned with the norms and values of many entities across the DoN enterprise.

The year-end spending within the DoN presents a phenomenon not seen in the private sector. For example, Congressional appropriations funding Operations and Maintenance and Military Personnel accounts have a one year expiration date. Once expired, the funds can no longer be used on new obligations. The funds will sit in an expired state for five years where they can be used against previously unrecorded obligations or as adjustments to already recorded obligations. Any leftover funds are cancelled and returned to the Treasury.

As a result, there is no incentive to be efficient with your spending. If you do not spend your allotted budget, it is given to another command before it expires or returned to the Treasury after cancellation. Thus, a successful command will execute every dollar received, and has a greater propensity to minimize data sharing; focus on efficiencies primarily at the command level; and minimize the transparency of their business operations.

[134] Interview with authors, November 4, 2010.

4. Political Influence

With approximately $708 billion requested for the DoD in the President's FY2011 budget[135] the citizenry, legislature, and watchdog organizations (government and non-government) demand greater oversight, and a movement to improve on the poor financial management controls and lack of transparency of business practices within the DoD and the DoN. Accountability to external entities, accessibility of information, and representativeness of the citizenry are of more concern in the public sector. Public sector organizations have a greater requirement for responding to citizens, higher level government authorities, and other peer organizations.[136] Public sector IT systems are designed to allow for a level of transparency which permits citizens and elected officials to openly critique and observe government practices.[137] Furthermore, public sector organizations are purported to be based on the premise of knowledge sharing, whereas knowledge sharing in the private sector is precluded by the competitive nature within the capital markets and is of minimal importance.[138]

Dealing with DoD and federal agencies, a complicated budgeting process, and continuous Congressional oversight results in many policies being codified into legal requirements. The DoN is not a business, but political bodies exert considerable influence in mandating business requirements that impact how the DoN conducts operations. A large number of policies and independent groups must therefore be appeased to meet the statutory requirements of the program, "In essence, independent fiefdoms that all have to say yes."[139] Thus, the DoN has to support multiple strategies in

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135 Department of Defense, "DOD Releases Defense Reviews, 2011 Budget Proposal, and 2010 War Funding Supplemental Request – Update," (February 2010), http://www.defense.gov/releases/release.aspx?releaseid=1328.

136 Barry Bozeman and Stuart Bretschneider, "Public Management Information Systems: Theory and Prescription," *Public Administration Review* (Blackwell Publishing) 46, no. Special issue: Public ManagementIinformation Systems (November 1986): 482, http://www.jstor.org/stable/975569?origin=JSTOR-pdf.

137 Bruce Rocheleau, *Public ManagementIinformation System*, Hershey, PA: Idea Group Publishing, 2006, 1.

138 B. J. Reed, "Strategic Information Systems Planning in U.S. State Governments: States and Prospects," *CiteseerX*, Edited by Syracuse University, governmental performance project, learning paper series The Maxwell School, August 2000, http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.93.6956&rep=rep1&type=pdf.

139 Interview with authors, November 4, 2010.

addition to its own. Though private companies are also subject to federal, state, and local laws and can be influenced by political bodies (i.e., the Congress and its various committees), the DoN receives its funding from these same bodies and is subject to a higher level scrutiny of its business practices. The DoN can be directed by Congress' power of the purse, but the same cannot be said for a private company.

Since 1996, the financial management and accounting practices of the DoD and other government agencies have been the subject of increasing public scrutiny. Specifically, the DoD's ongoing inability to produce auditable financial statements is a common theme in the GAO reports we reviewed. DoD business process transformation initiatives are regarded as "high-risk" by the GAO, and congressional oversight has increased considerably with the passing of at least nine significant financial management reform acts over the last twenty years (Table 5). In addition, a number of DoD and DoN policies (e.g., DoD ESI, DoD BMMP, and DoD BEA and ETP) arose through the years to complement the congressional financial reform acts. Combined with the speed at which mistakes are brought to the forefront of the public eye, the cumulative effect for public organizations is higher risk aversion and smaller probability of investing in costly new technologies.[140]

Another facet unique to the DoN, is the acquisition program. The private sector doesn't have an acquisition program like the DoD, and can therefore focus on the business enterprise throughout the decision-making process. The governance of the Navy ERP Program is derived from acquisition governance which does not have a business focus and doesn't consider BPR within the context of the milestone decision making. Many leaders do not have background in establishing enterprise-wide IT strategies and BPR efforts. Therefore, deferring to an acquisition based governance model makes sense because "there is an embedded acquisition governance process that is well understood and executed throughout the Navy".[141] It was noted that the acquisition program provided value by ensuring the program would reach full operability and be compliant with applicable statute and regulation. However, the successful roll-out of technology is

[140] Center for Technology in Government, "Making Smart IT Choices," *University at Albany-State University New York*, (September 1996), http://demo.ctg.albany.edu/publications/guides/making_smart_it.

[141] Interview with authors, November 4, 2010.

only one aspect in developing an enterprise business solution. In order to obtain the real benefits of an enterprise IT system, the Navy ERP must transition to an enterprise business perspective of governance to leverage the capabilities of the program across the DoN.

The level of scrutiny required of an ACAT 1AM acquisition program actually benefitted the development and deployment of the Navy ERP convergence because of the strong program management required to meet acquisition milestones. However, it is this same level of transparency which makes it hard to accept a standard enterprise-wide IT solution. Navy ERP can provide a higher level of transparency with a full audit trail, but the major domain owners do not want that to happen, "We come from a culture where we won't even tell the guy next to us-we don't even tell our bosses what we did…."[142] For example, DoN existing business practices promotes maximizing financial resources at a unit vice enterprise level. The sharing of information horizontally among peers and vertically with senior leadership (internal and external to the DoN) opens the door for questions concerning every commander's business practices and challenges their authority, "If you think people are going to let loose of their pet rock for the good of the Navy you are dreaming. It isn't going to happen. We had to literally pry rocks out of people's hands…."[143]

B. WEILL AND ROSS GOVERNANCE MODEL

The DoD does not have an institutionalized governance structure that covers the full breadth of responsibilities associated with the business transformation needed to establish a permanent enterprise-wide approach to BPR.[144] The DoN IT governance structure reveals an underdeveloped management foundation incapable of creating and

[142] Interview with authors, November 9, 2010.

[143] Interview with authors, November 4, 2010.

[144] U.S. Government Accountability Office, *Defense Business Transformation: Achieving Success Requires a Chief Management Officer to Provide Focus and Sustained Leadership, GAO-07-1072* (Washington D.C.: Government Accountability Office, 2007), 4.

implementing an effective enterprise architecture framework.[145] An appropriate enterprise architecture framework identifies the "as-is" environment and establishes the "to-be" environment and is thus a tool for IT management and organizational transformation.[146] What the DoN has instead is an informal decision-making structure lacking institutional leadership and the management foundation needed for instituting a successful enterprise structure.[147]

Using the Weill and Ross governance model, we examine the Navy ERP governance structure as it exists today. Our focus is on the key areas that provide the basis in developing any IT governance structure: (1) the decision-making domains; (2) input and decision-making rights; and (3) decision-making approaches (government archetypes).

1. Decision-Making Domains

Weill and Ross propose that all enterprises have five fundamental IT decision-making domains (Figure 6) to consider in implementing and managing the use of a strategic IT system. The governance structure of the Navy ERP Program explicitly focuses on two of the five fundamental domains: business application needs and IT investment and prioritization. The decision-making primarily concerns functional process owners emphasizing business needs, processes, and exceptions to standards. The Navy ERP Senior Integration Board (NESIB) prioritizes the needs and forwards to the resource sponsor for approval. The other domains are not clearly addressed within the hierarchy. The SME indicated that questions or issues regarding the IT specific decision domains (i.e., Principles, Infrastructure, and Architecture) were rarely resolved through this hierarchy. Additionally, none of the responses clearly identified who did make decisions regarding those domains.

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[145] U.S. Government Accountability Office, *DOD Business Systems Modernization: Military Departments Need to Strengthen Management of Enterprise Architecture Programs, GAO-08-519* (Washington, D.C.: Government Accountability Office, 2008), 3.

[146] U.S. Government Accountability Office, GAO-08-519, 6.

[147] U.S. Government Accountability Office, GAO-08-519, 3–8.

Furthermore, by not specifically addressing the IT specific decision domains, it questions the department's understanding of the role of the DON-CIO. Where most CIO's in the private sector are actively involved in the enterprise IT decision-making process, the DON-CIO is an under-utilized asset for the Navy. IT decisions should be made through the DON-CIO in conjunction with enterprise business process owners, with several SME indicating that the DON-CIO should have some role in the Navy ERP decision-making.

Lastly, we point out that the Navy ERP convergence structure (Figure 9) does not reflect the role of the acquisition program. The Navy ERP governance structure exists to support the acquisition program guidelines and milestones that must be strictly adhered to. The ultimate decision-making for the Navy ERP Program resides within the realm of the acquisition program and resource sponsor.

2. Input and Decision-Making Rights

The Navy ERP governance structure affords every stakeholder an opportunity to provide input to the decision-making process. Because of the size and complexity of the DoN, providing broad-based input rights for all stakeholders is a logical conclusion. Broad based input rights allow users to express concerns and needs, provide ongoing feedback, and maintain open lines of communication.

The existing governance body provides decision rights to all the major stakeholders. Taking this approach is counter-productive, but as several SME noted, this was a necessary choice because a major stakeholder who was not provided decision rights would cease to cooperate or decline to participate. Maintaining governance or advisory bodies with broad-based decision-making rights does not allow the right decision, at the right time, by the right people. From the experiences of several SME, having every stakeholder involved in the decision-making process created a cumbersome process which often resulted in no decisions being made. Additionally, the NESIB is considered to be the governance body, but its decision-making authority lies in selecting and prioritizing program needs. Ultimate decision-making authority resides with the acquisition program and resource sponsor.

3. Decision-Making Approaches

The Weill and Ross governance model uses government archetypes (Figure 7) to classify various IT decision-making approaches. Within the Navy ERP Program, the Federal archetype is the prevalent approach. The Federal approach is viewed as coordinated decision-making across various levels of the organization, and is considered to be the most difficult because enterprise leaders and organizational (i.e., command and unit level) leaders have differing perspectives.[148] The NESIB, the main body in the existing governance structure, takes a federated approach to its decision making and often causes competing views concerning the Navy ERP Program. Individual command goals often conflict with enterprise level goals and require some level of compromise to move forward. Furthermore, the NESIB does not have an established enterprise level perspective to align all of the competing goals, thus complicating an already difficult federated approach.

4. The Navy ERP Governance Hierarchy

The Navy ERP Program governance structure (Figure 9) is effectively comprised of a number of a high level advisory boards. Final decision-making authority does not reside with any of the boards or groups. The NESIB is considered the Navy ERP governing body, but the final decision making is deferred to the governance within the acquisition program, and hence lacks an end-to-end business process perspective for applying Navy ERP within the DoN enterprise. Furthermore, the SMEs indicated that an enterprise IT governance charter has never been finalized for Navy ERP. Attempts to establish a business oriented governance charter have consistently fallen short because acquisition milestone requirements throughout the researching, development, testing, and evaluation have carried the greatest weight in the decision making.

[148] Peter Weill, *Don't Just Lead, Govern: How Top Performing Firms Govern IT,* Working Paper #341, Sloan School of Management, Massachusetts Institute of Technology, Cambridge, MA: Center for Information Systems Research, March 2004, 6.

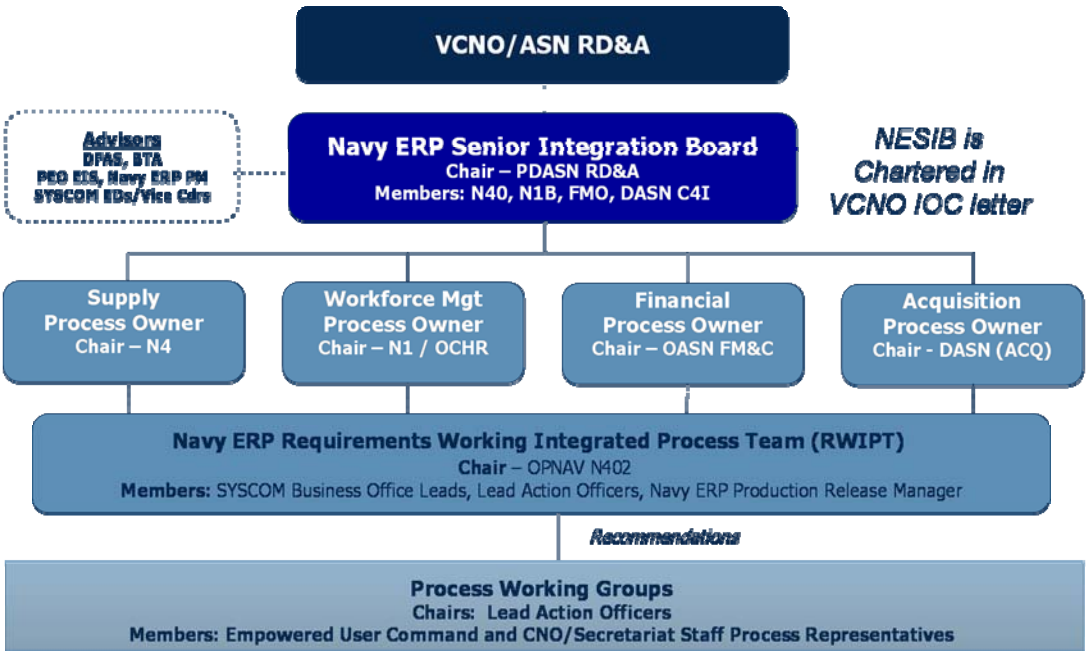
VCNO/ASN RD&A
Advisors
DFAS, BTA
PEO EIS, Navy ERP PM
SYSCOM EDs/Vice Cdrs
Navy ERP Senior Integration Board
Chair – PDASN RD&A
Members: N40, N1B, FMO, DASN C4I
NESIB is Chartered in VCNO IOC letter
Supply Process Owner
Chair – N4
Workforce Mgt Process Owner
Chair – N1 / OCHR
Financial Process Owner
Chair – OASN FM&C
Acquisition Process Owner
Chair - DASN (ACQ)
Navy ERP Requirements Working Integrated Process Team (RWIPT)
Chair – OPNAV N402
Members: SYSCOM Business Office Leads, Lead Action Officers, Navy ERP Production Release Manager
Recommendations
Process Working Groups
Chairs: Lead Action Officers
Members: Empowered User Command and CNO/Secretariat Staff Process Representatives

Figure 9. Navy ERP Governance[149]

C. NAVY ERP BEST PRACTICES

Both private and public best practices are tailored to the individual organization. Leaders and managers must evaluate current business processes, value the cost of change in their organization, and establish the necessary milestones to implement a comprehensive ERP roadmap for success. However, organizations often overlook many of the non-technical requirements to effectively leverage the enterprise capabilities of the ERP software. Successful implementations properly address process management, governance, and other nontechnical concerns.[150] Furthermore, the scope of the governance structure goes beyond successful implementation of the IT infrastructure, and focuses on business process improvements and upgrades for the life of the ERP program.

[149] Program Executive Office of Enterprise Information Systems, "Navy ERP Program: Brief for DLA Finance Process Review Committee Meeting," Defense Logistics Agency, (November 2009): 7, www.dla.mil/j-6/dlmso/Archives/Finance/meetings/19Nov09/PRC_Brief.ppt.

[150] Jim Welch and Dmitry Kordysh, "Seven Keys to ERP Success," *Strategic Finance* 89, no.3 (September 2007): 41.

SMEs were provided a list of best practices derived from Nah, Lau, and Kuang's research on implementation critical factors. The respondents were asked to rank the relative importance of the given best practices with regards to Navy ERP. Comparisons of the mean respondents' rankings to the occurrence of critical factors in research from Table 1 are provided below (Table 8). A high level of similarity exists between the SME group and our literature review in addressing the importance of governance over technical functions. However, we do see significant deviation with the importance of a project champion in the DoN versus private companies. Table 8 distinguishes Navy ERP best practices with regards to our analysis framework of Navy governance.

SOURCE	ERP Teamwork and Composition	Change Management Program and Culture	Top Management Support	Business Plan and Vision	BPR and Minimum Customization	Software Development, Testing and Troubleshooting	Effective Communication	Project Management	Monitoring and Evaluation of Performance	Project Champion
Navy ERP	**7**	**3**	**2**	**4**	**5**	**9**	**6**	**8**	**10**	**1**
RESEARCH	1	2	3	4	5	6	7	8	9	10

Table 8. Importance of Factors in Navy ERP vs. Nah, Lau, and Kuang's Research

1. Strategic Vision/Goals

The DoN decentralized leadership structure is effective in fulfilling the needs of the warfighter, but makes it challenging to institute an enterprise level business solution. Navy ERP requires standardized processes crossing multiple domains in order to achieve an integrated, end-to-end enterprise solution. This can only occur if the project champion has enough vested interest and sufficient authority to force domain owners to comply with the Navy ERP program. The project champion holds domain and process owners accountable from the Echelon I level and below. The SMEs suggested the DoN CMO as a likely candidate for project champion. Furthermore, the SMEs proposed the creation of an Enterprise Business Office responsible for overseeing the end-to-end business processes of the DoN enterprise. The primary role of the business office would be to support the project champion (i.e, DoN CMO) in developing, standardizing, and managing the enterprise level business processes of the DoN. The composition of this

team would be critical to ensuring sufficient knowledge and effective interaction among the numerous domain and process owners. To that end, the team must include technical as well as business process experts.

From the four pilots to the present Navy ERP convergence, the overarching strategic vision for Navy ERP still remains unclear to many stakeholders. Table 4 gives the best indication of the future of Navy ERP through FY2012. At the completion of the current program of record, Navy ERP will manage 53.8% of the Navy Total Obligation Authority (TOA) which is approximately $85 billion.[151] Interviewees agreed that Navy ERP will continue implementation to new commands past FY2012, but whether or not the entire financial system will be aligned with Navy ERP is still to be determined. This begs the question of how the DoN will be able to provide auditable financial reports by 2017 if the financial management capability of the Navy ERP program is not implemented across the Navy? An end-to-end enterprise architecture must be developed to fully realize the capabilities of the SAP software. A clear business plan and vision can assist in establishing a change management culture and promote BPR efforts by providing employees a strategic outlook, timeline, achievable goals, and expected benefits.

BPR and minimum customization is a huge problem that both the ERP PM and process owners deal with. The ERP PM attempts to optimize the ERP system by limiting interfaces and legacy processes while process owners fight to retain trusted operational practices that negatively affect the strategic vision of the enterprise. The decentralized organizational structure of the Navy allowed for a myriad of redundant systems that will eventually be captured within the ERP software and standardized across the enterprise.

Monitoring and evaluation of performance is another extension of the ERP team which ensures a performance standard is set and obtained to achieve the goals of the business plan and vision. Both private and public sectors share similar responsibilities.

[151] Navy ERP Program Office, "Navy ERP Timeline," Navy ERP Program, http://www.erp.navy.mil/timeline.html.

2. Structure

The Navy ERP project champion would also play a key role ensuring top management support from the major domain and process owners. Interviewees believed that top management support in the early stages of the convergence architecture was inconsistent among the major domain owners (e.g., SYSCOMs), but has exhibited improvement as Navy ERP is implemented in new commands and as existing ERP commands begin to understand the full capabilities of an enterprise business solution. This leads to the point that employees must be engaged and understand that Navy ERP is a top priority of their command as well as the DoN. Top management support is vital in ensuring that changes in processes, structures, and responsibilities are implemented so that every command leverages the new capabilities of the ERP system. SYSCOM Commanders, the program sponsor, and the Secretariat were identified as the leaders most responsible for top management support.

It is critical that Navy ERP form a diverse team of experts composed of business, technical, and military representatives to ensure efficient and effective ERP implementation. The ERP team must be able to capture the requirements of the war fighter while maximizing the capabilities of the ERP system. Navy ERP is a very technical investment which attempts to leverage the business capabilities of the ERP software to support a diverse group of war fighters and requirements. However, Navy ERP struggles to standardize business process across the enterprise which optimizes the software. Although much better than four separate pilot programs, the process has been very expensive and limited implementation efficiencies have been gained.

Effective project management is a direct result of a well-organized team that can manage resources, standardize business processes, and mitigate failures to maintain the implementation timeline. COOs, CFOs, and CIOs of the private sector ensure efficient ERP implementation which optimizes ERP capabilities and minimizes the investment. Navy ERP faces the constant struggle of supporting the warfighter above obtaining efficient enterprise capabilities. Return-on-Investment (ROI) is the ultimate goal for

private industry while the DoN focuses on military capability. PMs have additional constraints of meeting acquisition requirements that private sector implementations don't have.

3. Culture

Change management was an issue long before the inception of the ERP pilot programs. Since SYSCOMs were already focused on maximizing efficiencies within their respective domains, the aspect of re-designing organizationally efficient processes to support a standardized way of doing business across the enterprise was seen as taking a step back backward. Top management support is required to establish the acceptable behaviors and business practices, while continuously identifying and communicating the long term benefits of the Navy ERP program. Understanding how current processes will be executed in the Navy ERP system removes ambiguity and facilitates the transformation process. Additionally, change management must establish a culture in which stakeholders are encouraged to take ownership of and assist in improving the end-to-end business processes of the DoN. The leadership must educate and train users so they maximize the functionality of Navy ERP. The SYSCOM commanders, the program sponsor, and the Secretariat were viewed as the leaders responsible for implementing change management in conjunction with BPR efforts.

Effective communication is a vital medium of every organization especially one implementing radical changes to day to day operations. Navy ERP uses effective communication modes to inform, update, and educate stakeholders about benefits and improvements to the enterprise as well as obtain critical feedback on the enterprise.

4. Political Influence

Navy ERP has to appease many stakeholders outside of the Navy. Private sector implementations do not deal with the politics of resource funding and constant government accountability. The private sector project champion focuses on efficient implementation of the ERP software. If the DoN CMO is eventually identified as Navy ERP's project champion, he will have to balance efficient ERP implementation with changing government regulations.

Current acquisition regulations increase the scrutiny of Navy ERP by categorizing the program as an ACAT 1AM program. This requires many long range ERP decisions to be finalized by individuals several times removed from the experts who fully understand and manage the enterprise vision. Although software development, testing and troubleshooting are critical steps in both private and public sector implementations, the added layer of acquisition politics decrease the efficiencies often gained in the private sector.

D. SUMMARY OF ANALYSIS

Our framework looked at DoN characteristics derived from four focus areas: (1) Strategic Vision/Goals, (2) Structure, (3) Culture, and (4) Political Influence. During the course of our research we discovered that the characteristics did not equally affect the governance of the Navy ERP Program. The factors are presented in a Venn diagram (Figure 10) to exhibit the mutual effect and relative importance across the focus areas.

Traits with the most overlap are identified as having the greatest effect on the governance of the program. The SME interviews were key in substantiating the effect of our posited characteristics on the governance of the Navy ERP Program. The influence of the characteristics in each focus area was determined by SME responses which identified focus areas in addition to the primary areas we associated with each characteristic. Of all the characteristics examined, leadership and goal clarity were the most significant factors affecting the governance of the program.

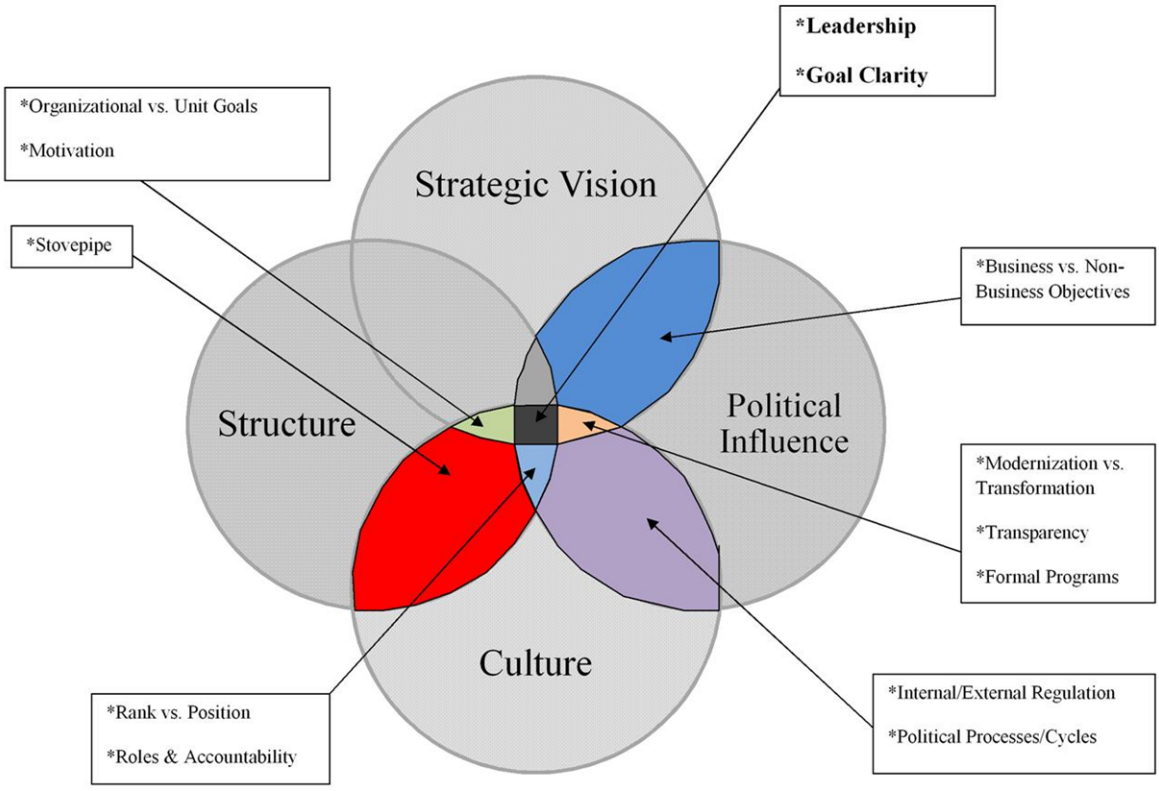

Figure 10. DoN Characteristics Affecting ERP Governance

The following is a brief description of the issues associated with the characteristics that are significant in three or more of our focus areas:

- **Leadership Issues:** (1) Lack of sustained executive level support; (2) Minimal departmental commitment to the program; (3) Inability to cut across departmental and cultural boundaries; (4) Inability to promote needed organizational change; and (5) Legally mandated positions (e.g., DON-CIO) not actively involved in the enterprise.
- **Goal Clarity Issues:** (1) Missing an enterprise level strategic vision; (2) Does not define measureable goals and objectives for the enterprise; (3) Competing goals across the systems commands and other organizational entities; and (4) Conflict between military and political goals.
- **Rank vs. Position Issues:** (1) Positional authority insufficient in overcoming rank hierarchy and (2) Inadequate delegation of decision-making rights.
- **Roles and Accountability Issues:** (1) Roles and responsibilities of individuals and governing bodies not clearly defined; (2) Advisory vs.

decision-making entities; and (3) No forcing function to hold people accountable to the enterprise initiatives.

- **Organization vs. Unit Goal Issues:** (1) Autonomy allows for establishing goals that may not support enterprise goals; (2) Focus on maximizing efficiency at the unit level; and (3) cultural norms established at the unit level do not support enterprise level goals.
- **Motivation Issues:** (1) Focus of many users is on unit level objectives; (2) Business processes considered to be less important, back-office functions; and (3) No incentive to learn a new system.
- **Modernization vs. Transformation Issues:** (1) Primarily technology implementation vice BPR and (2) Strong resistance to change ingrained business practices.
- **Transparency Issues:** (1) Not sharing information is a cultural norm; (2) Perception that sharing information results in a loss of power; and (3) Only negatively perceived benefits for improving transparency of unit and organizational business practices.
- **Formal Program Issues:** (1) External processes and entities to the DoN; (2) Acquisition based governance approach; and (3) Acquisition programs do not incorporate business objectives or BPR efforts into the milestone requirements.

We also note a correlation between our posited characteristics and the SME recommended best practices (Table 8). The top five best practices are listed from most to least important along with the problem areas we believe they can have the greatest effect on:

- Project Champion (Leadership),
- Top Management Support (Leadership, Rank vs. Position, and Roles and Accountability)
- Business Plan and Vision (Goal Clarity, Roles and Accountability, Organization vs. Unit Goals, and Formal Programs)
- Change Management Program and Culture (Motivation and Transparency),
- BPR and Minimum Customization (Modernization vs. Transformation and Formal Programs)

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VII. CONCLUSIONS AND RECOMMENDATIONS

A. SUMMARY

Many large-scale ERP IT systems have been hindered by numerous implementation challenges and Navy ERP is no exception. Though the origins of ERP in the private sector date back to the 1960s, the use of ERP in the public sector is still in its infancy. Most of the knowledge base is developed from lessons learned and best practices of private companies.

Existing research suggests that similarities exist between public and private sector organizations that warrant the use of ERP IT systems in public and or non-profit organizations. However, in the case of the DoN ERP system implementation, we posit that the DoN is a public sector entity with unique characteristics that should be considered in developing an appropriate IT governance structure for the Navy ERP Program.

We utilize two tools to analyze the DoN characteristics and existing Navy ERP IT governance structure: a public sector analysis framework and an IT governance model. From our literature review of public sector theories, we developed an analysis framework for examining public sector characteristics of the DoN that may influence the governance of the Navy ERP Program. With respect to the IT governance model, we selected the Weill and Ross IT model to analyze the existing Navy ERP Program governance structure.

Our analysis identified several areas of interest concerning the affect of DoN specific characteristics on governance of the Navy ERP Program. Based on the initial findings, we developed a series of open-ended questions to confirm the existence of the influencing factors in the Navy ERP Program governance structure. We conducted interviews with SME from BTA, DON-CIO, PEO-EIS, ASN FM&C, OPNAV staff, the resource sponsor, and two private sector companies. The interviews validated our hypothesis that there are DoN specific characteristics that significantly influence the

governance of the Navy ERP Program and therefore the characteristics must be considered when implementing best practices and BPR methods taken from the private sector. Our results are summarized in Table 9.

DoN Specific Characteristics	Challenges Associated with the Characteristic	"Best Practice" to Address Challenge
Leadership	(1) Lack of sustained executive level support; (2) Minimal departmental commitment to the program; (3) Inability to cut across departmental and cultural boundaries; (4) Inability to promote needed organizational change; and (5) Legally mandated positions (e.g., DON-CIO) not actively involved in the enterprise.	Project Champion; Top Management Support
Goal Clarity	(1) Missing an enterprise level strategic vision; (2) Does not define measureable goals and objectives for the enterprise; (3) Competing goals across the systems commands and other organizational entities; and (4) Conflict between military and political goals.	Business Plan and Vision
Rank vs. Position	(1) Positional authority insufficient in overcoming rank hierarchy and (2) Inadequate delegation of decision making rights.	Top Management Support
Roles and Accountability	(1) Roles and responsibilities of individuals and governing bodies not clearly defined; (2) Advisory vs. decision making entities; and (3) No forcing function to hold people accountable to the enterprise initiatives.	Top Management Support; Business Plan and Vision
Organization vs. Unit Goals	(1) Autonomy allows for establishing goals that may not support enterprise goals; (2) Focus on maximizing efficiency at the unit level; and (3) Cultural norms established at the unit level do not support enterprise level goals.	Business Plan and Vision
Motivation	(1) Focus of many users is on unit level objectives; (2) Business processes considered to be less important, back-office functions; and (3) No incentive to learn a new system.	Change Management Program and Culture
Modernization vs. Transformation	(1) Primarily technology implementation vice BPR; and (2) Strong resistance to change ingrained business practices.	BPR and Minimum Customization
Transparency	(1) Not sharing information is a cultural norm; (2) Perception that sharing information results in a loss of power; and (3) Only negatively perceived benefits for improving transparency of unit and organizational business practices.	Change Management Program and Culture
Formal Programs	(1) External processes and entities to the DoN; (2) Acquisition based governance approach; and (3) Acquisition programs do not incorporate business objectives or BPR efforts into the milestone requirements.	Business Plan and Vision; BPR and Minimum Customization

Table 9. DoN Specific Characteristics, Associated Issues, and Recommended Best Practices

B. PRIMARY RESEARCH QUESTION

What are the Qualitative Differences Between DoN and Private Sector Governance Structures that Affect the Strategic Planning, Implementation, and Policy Formulation of Enterprise-Wide IT Systems?

The enterprise IT governance structure in the Navy is more technology than business focused. The foundations of the existing governance board are rooted with the acquisition program of the Navy ERP convergence. The result is a strategic focus on supporting milestone decisions in the deployment of the IT technology, and minimal emphasis on BPR which must go hand in hand when implementing an enterprise business solution.

Ultimately, the acquisition governance structure validates Navy ERP as if it were another program that can be successfully rolled out by meeting the program requirements at the different milestone reviews. This governance structure is sufficient in delivering a new weapon system, aircraft, missile, etc. that is readily acceptable and useable, and aligned with the strategic objectives of the DoN. However, in implementing an enterprise-wide IT system as part of a business transformation effort, Navy ERP governance fails to provide several structural elements exhibited in successful implementations:

- Business focused strategic vision with enterprise level goals and objectives.
- Consistent business focused C-level equivalent review, support, and accountability mechanism.
- Clearly defined roles and responsibilities within the existing governance structure.
- Establishing end-to-end business process owners and ensuring sufficient decision-making rights provided to the business enterprise leaders.
- BPR focus on establishing standard business practices across the enterprise.

C. SECONDARY RESEARCH QUESTIONS

1. What Entities, Internal and External to the Navy, Contribute to IT Policy Formulation, Implementation, and Enforcement?

Internally, the DoN is a stove-piped organization with domains which are in constant competition for limited resources. Within each domain are a number of organizations and commands with separate goals and objectives (e.g., NAVSEA and NAVAIR have different objectives, and within NAVAIR fixed-wing versus rotary aircraft have different missions). As a result, domain and process owners must be provided equal decision-making rights in order for Navy ERP to attain a working level of cooperation. The trade-off is that competing agendas do not support enterprise level decision making and policy formulation. Additionally, internal regulation by system users across all levels of the DoN influence the program governance in that: (1) they do not conform to standardized business practices, and (2) they maintain legacy systems requiring complex interfaces with Navy ERP COTS software.

Externally, the DoN is influenced by DoD policies and directives, acquisition oversight, government watchdog organizations (e.g., GAO and DoD IG), and federal statute and rule. The myriad of legal requirements negatively impact IT governance by introducing a significant number of potentially competing requirements and goals. Also, the Navy ERP Program is funded with congressional appropriations. This requires a high level of transparency which invites increased scrutiny by the public which can affect the Congressional oversight and guidance provided to the program.

2. Who is Responsible for Developing the DoN's ERP Requirements and How are They Selected to Participate?

The Navy ERP requirements were predominantly focused on meeting requirements from an acquisition perspective for the program. Figure 9 exhibits the complicated and cumbersome hierarchy used to determine Navy ERP requirements. Proposed requirements flow from the various working groups and process owners. The requirements are ultimately fielded by the NESIB and priorities are established through consensus. However, competing objectives among the NESIB members sub-optimizes the decision making as more often than not members agree to disagree and or have to

consider trade-offs with other board members which negatively impact the ability to develop enterprise level decisions. In essence, the lack of a strategic vision, ill-defined roles and responsibilities, and rank and positional authority of the domains' leadership resulted in all domain owners participating in the input phase and decision-making phases. As was the norm, the selection of participants was dictated by the need to appease each major domain and process owner in order to create an amicable working environment.

D. RECOMMENDATIONS

1. For DoN

The following are proposed recommendations for improving the governance structure and overcoming the implementation challenges of the Navy ERP Program:

- Appoint a Navy ERP Project Champion who has end-to-end enterprise responsibility and requisite authority to command compliance across all levels of the DoN enterprise. The DCMO for the Navy was identified by several SME as an appropriate champion.
- Establish an Enterprise Business Office staffed with a balance of technical, business, and military experts responsible for implementing the DoN's business plan, validating end-to-end business processes, and establishing appropriate performance metrics. The DON-CIO is a position which several SME identified as being under-utilized in the Navy ERP Program.
- Create a business oriented strategic vision and establish a governance charter clearly defining roles and responsibilities to support the vision. Also, assign decision rights and sufficient authority to those people who will be held accountable for the program.
- Incentivize ERP compliance by including it as a part of performance evaluations for applicable civilian and uniformed personnel.
- Propose a new or streamlined IT acquisition process which allows mature IT programs to gain efficiencies by accelerating decision authority, especially when expanding an already proven system.

2. Areas for Future Research

During the course of our research we identified other issues which were beyond the original scope of our work and require further investigation. Those issues revolve around the following areas:

- What specific governance characteristics associated with the DoD acquisition system make it more, or less, effective in implementing an enterprise level IT solution such as Navy ERP?
- What is the definition of return on investment (ROI) for the business process re-engineering (BPR) efforts of the DoN? What performance metrics can be established for analyzing the effectiveness of BPR efforts within the DoN?
- Compare governance structures of ERP implementations across the federal government to create a database identifying best practices and potentially systemic problems specifically associated with Federal government entities.

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